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"IT'S ABOUT MORE THAN JUST ANIMALS": ENVIRONMENTAL POLITICS OF ZOO-ADJACENT CONSERVATION(ISTS) IN THE U.S.

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DISSERTATION

A dissertation submitted in partial fulfillment of the
requirements for the degree of Doctor of Philosophy in the
College of Arts and Sciences
at the University of Kentucky

By

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2021

ABSTRACT OF DISSERTATION

"IT'S ABOUT MORE THAN JUST ANIMALS":
ENVIRONMENTAL POLITICS OF ZOO-ADJACENT CONSERVATION(ISTS) IN THE U.S.

This research explores the influences of diverse environmental politics in shaping zoo-adjacent conservation activities in the United States. Based upon 13 months of multi-sited ethnographic research, conducted with conservation actors across six states, the researcher investigates and documents how conservation professionals—operating in contexts adjacent to zoological institutions—experience and respond to the socio-environmental implications associated with the cascading effects of global environmental change. In the face of current challenges and uncertain environmental futures—shaped by habitat alterations, ecological transitions, and species declines/extinctions—conservationists are undergoing their own processes of reassessment and reconfiguration of their underpinning philosophies and body of practices that inform their relationships to the environment. The research lays out an argument about how in the face of socio-environmental change, conservation—and the ongoing reconfigurations of its identities, priorities, and practices—are being shaped by conservation organizations and individual conservation actors across scales of influence; from powerful organizations and their executives, to on-the-ground professionals doing the day-to-day work of conservation programs. This represents a contribution to understandings of how 'Conservation' comes into being, which, in the literature, is often treated as a monolithic entity and is absent of the contextualized realities of conservation organizations and the individuals who comprise them. Centering examinations of those contextualized realities that shape how conservation comes into being across scales, this research examines: how zoological institutions are increasingly foregrounding narratives about their identities as "conservation organizations"; how professionals are grappling with their shifting understandings of 'nature' and the role of conservation interventions therein; increasing interventionist approaches and related connections between on-the-ground professionals and species of concern; the impact of scientific knowledge politics on conservation activities; and the webs of social relations involved in enacting contemporary conservation actions. Ultimately, this research understands Conservation—a diverse body of philosophies and praxis—as an arena of human-environmental relation(s) that must be examined across scales of influence and through the contextualized realities of individual actors and organizations who comprise it. Moving beyond traditions of monolithic treatment, this project contributes to scholarly work involved in developing a more "multifaceted understanding" of conservation activities through attention to the experiences and "complex realities" of conservation professionals.

KEYWORDS: Conservation, Connection, Politics of Science, Zoological Institutions, U.S.

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TABLE OF CONTENTS

LIST OF FIGURES

Chapter 1: Introduction

Anthropology and Conservation

The last two and half decades in anthropology have seen a precipitous increase in ethnographic investigations of global nature conservation, with much of that research and writing focused on conservation's relationship to structures of power and its role in systems of environmental access and exclusion. This increased attention to the impacts of transnational nature conservation developed in tandem with amplified considerations of questions pertaining to 'globalization processes' within the discipline, in the 1990's. Anthropological examinations of conservation activities were additionally linked with the solidification of the interdisciplinary framework and field of political ecology, as an organizing analytical umbrella. Under a broadly defined political ecology, investigations and analyses over the last 25 years have consistently sought to enfold theoretical approaches to environment, power, politics, economics, society and culture into anthropological ethnographies of conservation.

A brief overview of conservation-linked ethnography and conceptual literature over that time period shows attention to: the establishment of 'fortress' conservation (Brockington 2002) and the growth of 'community-based natural resource management' (CBNRM) activities (Brosius 1996, Brosius and Tsing ed. 2005), nature constructionism in conservation (Escobar 1996, 1998, 1999), local and indigenous dispossession connected to Protected Areas (Anderson and Berglund ed. 2003, West et al. 2006, Brockington et al. 2008, Fairhead et al. 2012), connections between conservation activities and global neoliberal capitalism, development, and the 'green economy' (Igoe and Brockington 2007, Rudiak-Gould 2012, Büscher et al. 2014, Holmes 2018), systems of governance and

conservation (West 2006, 2016), international conservation design and execution (Carrier and West ed. 2009), social constructions of biodiversity and species vulnerability (Toussaint 2005, Choy 2011), conservation connections to socialized landscapes (Ogden 2011), and politics of invasive species (Wanderer 2020).

However, when reading the breadth of ethnography and wider anthropological literature contributing to scholarly conversations around conservation over the last few decades, I—like some others writing in the last few years—find myself wondering about the *people* involved in shaping and enacting conservation activities. With a few exceptions (e.g. Lowe 2006, Vivanco 2007, Hathaway 2013, Wanderer 2020) I am consistently curious as to where the conservation*ists* are within all of this research and scholarly writing on conservation?

Importantly, I do not pose this question to detract from the scholarly works that have participated in examining and highlighting the many harmful manifestations and socio-political impacts of transnational nature conservation; often by elevating the voices and stories of local and indigenous populations who are most affected. Or, because I seek to further elevate the voices of a population that—especially within those transnational activities—often have outsized influence. But rather, I find myself asking what understandings about 'conservation' might be lacking, or all together absent, when ethnographic examinations are devoid of the professionals—the *people*—who are in reality, the human composition of conservation. Where in the literature produced by a research discipline committed to contextual and nuanced examinations of intersecting social phenomena are the "contextualized realities" of conservation professionals (Larsen and Brockington 2018)? How do we claim to recognize and understand nature conservation

as a complex socio-political phenomena beyond just biodiversity and technical solutions, if we neglect the social worlds of the people who participate in manifesting those phenomena *into* the world?

Within the last few years, a small number of scholars have begun to reflect on the treatment of nature conservation (often oriented at the organizational scale and through the lens of conservation NGOs) within the anthropological literature. Larsen and Brockington ask, "how is it possible to represent what conservation NGOs are and what they do if we acknowledge them as dynamic and made up of webs of relations and networks, rather than as monolithic entities?" Posing a related question about whether anthropological critiques are "one step behind a dynamic reality (2018:2)," due to this history of monolithic treatment Kiik (2018) notes how a potential reticence on the part of social science to include conservation*ists* within their ethnographies about conservation—a "representational imbalance"—could be understood as a "reactive move against how conservationists' voices tend to dominate…in front of global audiences." However, a functional reality of this absence within anthropological representations and analyses of conservation is that a *very* human socio-environmental arena lacks the contextualizing voices, decision-making, values, positionalities, and everyday experiences of conservation professionals. Absent all of the internal nuance of complex social phenomena to which anthropology is typically committed. But of course, recognition of this gap is not necessarily new. In 2009 Heyman pointed to the lack of adequate studies of the "wider socio-cultural worlds [of conservation staff]: their life experiences…[and] their perspectives on life" (2009:186). While Kiik (2018) in his description of "conservationists as missing ethnographic subjects" writes that conservationists are rarely,

> …personalised, humanised, [or] represented within nuanced stories…[they too often] remain abstract, homogenous, and faceless [as] representatives of global ideological regimes and dominant powers. Rarely do we enter the conservationists' offices or workspaces, not to mention travel with them back home. In many of the ethnographies, the conservationists do not speak about their opinions, experiences, visions or dilemmas; much less [their] struggle[s], joy, and everyday labor.

Additionally, much of the anthropological literature on nature conservation, in its interrogation of conservation's connections to global hegemonic systems, follows anthropological traditions of international and non-local research; relative to the concentration of anthropologists trained and/or living in the global north. This results in an additional geo-political gap in the ethnographic literature in regards to investigations of conservation activities—and conservation*ists*—which are 'local' to those anthropologists in the global north. The majority of anthropological focus on conservation has been oriented around transnational flows of conservation priorities and actions: international activities designed and led by global elites and 'outsiders.' But what does an ethnography of conservation(ists) look like when professionals are not outsiders, or at least not in the ways that anthropology has grown accustomed to seeing and treating them?

In this project I substitute the terms 'conservationists' and 'professionals' (among others) when referencing those individuals engaged in the work of conservation. However, my treatment of these environmental actors is in line with Boyer's (2008) conceptualization of 'experts' in ethnography. He argues for an anthropological treatment of such experts, not as "rational(ist) creatures of expertise"— which would further perpetuate an decontextualized treatment of conservation(ists)—but rather as social beings with all of the attendant complexity therein. This attention to 'experts' is linked to relatively recent efforts within anthropology to expand the ethnographic gaze to encompass professionals and specialists, both individually and collectively through organizations (Wright 2004), NGOs

(Schuller and Lewis 2014), and institutions (Hejtmanek 2016). In the context of conservation activities this has the effect of "spread[ing] the 'revealing' more evenly" through analyses of the social worlds of the environmental actors who are 'relatively powerful and elite' (Kiik 2018, Larsen 2018, Redford 2011, Wilkie 2018).

While this project is careful to avoid the snare of treating conservation professionals as faceless "rational(ist) creatures of [scientific] expertise", it necessarily maintains vital attention on the formative relationships between conservation professionals and the politics of science that shape contemporary conservation actions. In connection with those scholars who have worked to incorporate both conservation professionals and the politics of scientific thinking, values, and processes into their ethnographic investigations of conservation actions (Lowe 2006, Choy 2011, Parreñas 2018, Wanderer 2020), this research consistently attends to the challenges faced by conservation(ists) as they navigate the 'complex realities' of conflicting scientific knowledge politics. The treatment of scientific 'experts' as social actors with all of the incumbent complexities, in the context of this research, demands that we investigate the social and political negotiations that are part of the everyday experiences of conservation science professionals.

Furthermore, in a contemporary context characterized by ongoing and accelerating rates of environmental change, conservation action as well as conservationists are operating beyond the scope of typical anthropological concern and analysis. Professionals, organizations, agencies, and publics are engaged in efforts to further understandings of ecological issues and implement interventions, that are largely outside of conventional anthropological attentions. In recognition of this, I am intentional in my understanding of 'conservation'—in all of its diversity of contexts and compositions—as an 'arena of

human-environment relations' that is inhabited by social actors and is formed into its varied expressions through the influence of those constituent human and non-human ecological parts.

Conservationists work in many different contexts, and much of the anthropological literature on conservation has underrepresented that heterogeneity of conservation realities, as well as the conservationists themselves, in favor of predominating foci on activities that occur in protected areas. Examinations of these contentious interactions are often described as the 'parks and people debate.' Recognizing this (over)representation of transnational protected area politics, what more might we learn about the scope of nature conservation—an arena of heterogenous human-environment relations—through ethnographic attention to more diverse (and potentially emergent) forms of conservation action and the people who enact them, amidst environmental change?

This project is an argument for an expansion of anthropological attentions and of our treatment of nature conservation. We must normalize the inclusion of "flesh and bone individuals and social groups" (Kiik 2018) and all of their corresponding "complex realities" (Larsen and Brockington 2018) within our ethnographies of conservation. We must orient our gaze to include examinations of conservation activities within underrepresented contexts, and we must expand our attentions—amidst ongoing environmental change—towards recognizing and examining the wider spectrum of activities and people that fall under the monumental moniker of conservation.

In efforts to fulfill these goals of an anthropological ethnography of contemporary conservation that is: beyond the transnational 'parks and people' category, that takes

seriously conservationists as its ethnographic subjects, and that is attendant to the forms of conservation activities and emergent interventions that have both been outside of anthropological foci and are undergoing transformations in response to environmental change, this project takes as its focus the lives, experiences, and activities of conservation professionals who work in proximity to zoological institutions (people I came to refer to as 'Zoo-Adjacent Conservation(ists)': (see: Important Terms)).

HISTORICAL TRAJECTORY OF ZOOLOGICAL INSTITUTIONS

The contemporary manifestations of zoological institutions that many people may be familiar with, have their ancestral roots in the historic menageries of the past. Some of the earliest records of the captive management of exotic animals—differing from domesticated varieties or stock animals—come from Egypt and Mesopotamia nearly 4,500 years ago, circa 2500 BCE. Some of the animals documented in these menageries included hyenas, cheetahs, baboons, and antelopes. By the 13th century BCE these collections housed captured elephants and giraffes. Ramses II was recorded to have kept pet lions. In ancient China, during the Zhou Dynasty 2000-1000 BCE, walled parks were built that housed exotic animals by the royals. During the Han Dynasty (circa 200 BCE) records show the prevalence of private menageries for wealthy elites that housed tigers, rhinoceros, and elephants. Menageries were also documented in ancient Greece, such as the one owned by philosopher Aristotle in the 4th century BCE that prompted the first book dedicated to the study of animals, Aristotle's *The History of Animals* (Τῶν περὶ τὰ ζῷα ἱστοριῶν / Historia Animalium). The practice of keeping captive animal collections would extend from the Greeks to the Romans, and would come to include both exotic animal viewing spectacles and their use in entertainment via gladiatorial exhibitions.

Royal and wealthy private menagerie's persisted through the first millennia of the common era, as empires and finances allowed. These private animal collections stood as symbols of wealth, power, and domination over nature. During the medieval period in Europe, gifts of exotic animals for these menagerie's were commonplace. Abbasid Caliph Harun al-Rashid sent Emperor Charlemagne the gift of an elephant for his private collection in 802 CE (the elephant's name was Abul-Abbas). Elizabeth I of England also placed leopards on public display in the Tower of London.

The oldest known continuously operating zoo is the Tiergarten Schönbrunn (Schönbrunn Animal Garden) in Vienna, Austria. The zoo was originally a royal lion park before it was made a public park and zoo by the Holy Roman Emperor Francis I, in 1752. Ultimately, this would be how many of the first public animal gardens and zoological parks came to exist, they transitioned from private royal menageries into public spaces of spectacle. Tiergarten Schönbrunn helped popularize public animal displays across Europe and Russia. This model came to define the central concept of a "zoo": a public display to satisfy public interests but also to be a site of study for the burgeoning scientific study of animals. Carl Linnaeus the Swedish zoologist/taxonomist who formalized taxonomic binomial nomenclature visited as part of his tours of Europe.

While Tiergarten Schönbrunn is documented as the oldest known zoo today, the London Zoo in Regent's Park is arguably the symbol of the first 'modern zoo'. Founded by the Zoological Society of London (ZSL) as the first scientific zoo, it was dedicated to both public animal exhibition and the scientific study of zoology. Zoos would continue to develop through the end of the 19th century and into the early 20th century. In 1907, famous

wild animal merchant Carl Hagenbeck[1] (1844-1913)—known for supplying exotic animals to European zoos, as well as P.T. Barnum—created Tierpark Hagenbeck in Hamburg, Germany. Hagenbeck's zoo was notable for its similarity to early Assyrian menageries, in which enclosures were built without bars and were styled to mimic species' native habitats. Importantly, Hagenbeck's enclosure designs and the London Zoo's emphasis on scientific research would become the ideal for zoological institutions through the early and mid-20th century (Hanson 1996, Brambell 1993).

THE EMERGENCE OF ZOO CONSERVATION

A change began to occur within some zoological institutions in 1970's that directly corresponded to the emerging environmental movement(s) of the 1960's and 1970's. Some zoological institutions began to reorient their activities towards developing wildlife conservation efforts in response to public awareness. In the U.S. and Europe, where the largest number of zoos and aquariums are concentrated, this reorientation towards participating in conservation action was piecemeal. While with a number of high-profile institutions underwent a complete rebranding as 'conservation organizations'[2] in the 1970's, between the 1970's and the present there was significant inconsistency in how newly espoused conservation priorities where materialized by these organizations.

In part, many zoological institutions rebranded their existing activities under the "conservation" umbrella and expanded the meaning the of the term—perhaps until it was

[1] It is important to also recognize the long and interrelated history between zoological parks, racist ideologies and science (Linneaus), colonialism, human enslavement, and the capture/forced display of people within zoo exhibits (Hagenbeck). (See: "Human Zoos: A Shocking History of Shame and Exploitation").

[2] See: San Diego Zoo, Bronx Zoo Group (turned Wildlife Conservation Society (WCS)), Smithsonian Zoo/Smithsonian Conservation Biology Institute, and Zoological Society of London's London Zoo.

nearly meaningless[3]. Activities that fall under this expanded use of the term, but are points of conflict, are labeling public education programs as conservation, recycling as conservation, and increasingly displaying "threatened or endangered" species in zoo collections to 'raise awareness'.

Beyond these rebranding activities, often described as 'marketing efforts' by conservationists during my field research, there was also an expansion of more practical aspects of wildlife conservation efforts on the part of some zoos. Interestingly, it was described to me in multiple interviews how the executive boards of zoological institutions—who are the primary institutional decision makers—were often moved into the arena of 'conservation action' from two fronts. First, internal pressure from staffers who saw a window for their skills and zoo capacity to contribute to wildlife and habitat conservation. Second, from external pressures from public calls for zoos invest more in animal welfare, research, and conservation activities (See: Chapters 2 and 5). This trajectory towards increased zoo participation in conservation activities over the last four decades can be organized into three categories: 1)'Pass-Through' Funding, 2) Captive Population Management, and 3) Field Conservation.

Prior to the intersection of zoos and aquariums and the growing conservation movement of the 1970's, most zoological institutions were primarily focused on captive-animal display for public entertainment. As zoos were increasingly navigating pressures to

[3] During numerous interviews and informal conversations with zoo-adjacent conservation practitioners I encountered a kind of skepticism about the zoo's commitment to conservation. Dr. Brian Miller described how "zoos were dragged kicking and screaming into conservation" while Natalie Ingle reflected on the practice of zoos labeling a wide range of activities as "conservation". This conflict over conservation also led people to Dr. Graeme Patterson to make declarations that "conservation action" as he terms it, is only defined as actions that result in more intact habitats and larges species populations in the wild; everything else is a bastardization of the label 'conservation' for publicity.

participate in the growing conservation movement, animal welfare activists were also drawing public attention to questionable zoo practices and the ethically murky waters of captive animal displays for entertainment. In response, zoological institutions began to mobilize their public audience in order to fundraise financial support for the growing number of conservation efforts around the world, as an initial step away from prioritizing the role of zoo as spectacle. This kind of conservation support—which Dr. Graeme Patterson of the Denver Zoo's Field Conservation Department referred to as being a "pass-through organization"—was an initial step. However, a shift in focus to the financial support of field conservation programs was criticized as a convenient way for zoological institutions to shift some of the scrutiny and attention away from their primary business model of captive animal display.

However, as the conservation movement of the 20th century increasingly shined a spotlight on accelerating global issues of habitat decline and the increasing rate of species population declines, many zoological institutions—often led by conservation motivated staff—refocused efforts on the captive management of threatened and vulnerable species. Like the leveraging of existing public audiences to fundraise for conservation programs, the increased emphasis on maintaining threatened and vulnerable species in captivity was a path for zoos to capitalize on existing capacity. The skillset to successfully facilitate reproduction and rear sensitive species could be almost exclusively contained within the zoo community[4]. Initial efforts to emphasize threatened species in captivity occurred at the level of the individual zoological organization. With zoos focused on existing species in their collections whose wild counterparts were under threat of decline. Then, beginning in

[4] Aside from private collectors/breeders.

the early 1980's the Association of Zoos and Aquariums (AZA) in the United States, the largest zoological accrediting body in the North America, saw an opportunity for a more integrative inter-institutional effort. In 1981 the AZA launched the Species Survival Plan program (SSP). The SSP began as a,

> Cooperative population management and conservation program for selected species in zoos and aquariums in North America. Each SSP manages the breeding of a species in order to maintain a healthy and self-sustaining population that is both genetically diverse and demographically stable.

The AZA established a set of protocols and guidelines that would facilitate the SSP's implementation across institutions that house species of interest. They describe that,

> Most SSP species are endangered or threatened in the wild, and have the interest of qualified professionals with time to dedicate toward their conservation. Also, SSP species are often "flagship species," well-known animals which arouse strong feelings in the public for their preservation and the protection of their habitat. Examples of "flagship species" include the giant panda, California condor, and lowland gorilla.

As of 2021, the AZA's SSP program contains nearly 500 Species Survival Plans across accredited institutions throughout North America. These programs are managed by corresponding Taxon Advisory Groups (TAGs) and each SSP is responsible for "developing a comprehensive population studbook[5]" that accounts for every individual of the species housed in any of the 240 AZA accredited North American facilities and establishes a "Breeding and Transfer Plan which identifies population management goals" for all SSP species. (AZA 2020)

This second category of managed captive populations is sometimes referred to as the "Ark Model" of conservation. It is a framework for species preservation efforts in which zoological institutions are seen as a last bastion of hope for species that are

[5] The language of "studbook" is shared with managed breeding practices, like those associated with equine breeding practice in which the lineages of all known individuals is catalogued to guide breeding pairing.

threatened with population declines, regional extirpations, or complete extinction. Another name for these managed populations is, Captive Assurance Colonies. Assurance colonies are thought as an insurance policy against the complete extinction of their species. Some examples of species that are classified as "Extinct in the Wild" (EW) by the IUCN's Red List but that still exist in captive zoo populations, are: the Kihansi Spray Toad (EW 2009), Spix's Macaw (EW 2016), the Guam Kingfisher (EW 1986), and the Mexican Potosi Pupfish (EW 1996) (IUCN Red List 2020).[6]

The third category of zoological institution conservation activities is related, in part, to an extension of the Species Survival Plans above. This category of 'field conservation' is one in which zoological institutions are directly involved in conservation actions in species' native ranges/habitats. This body of conservation programming can take many forms, depending on the institution and the species or habitats in question. These can range from zoo teams conducting research on species and habitats in the wild, the reintroduction or translocation of extirpated or extinct species that have been maintained in captivity back into their native ranges, or zoological institutions establishing and operating their own field conservation programs. Some of the most famous examples of this category of conservation are the reintroductions of extirpated or EW species like the Scimitar Horned Oryx of the African Sahel, Prezwalski's Horse of Central Asia, the California Condor, and the Brazilian Golden Lion Tamarin. These species were either extinct in the wild or functionally extinct (population not large enough to successfully recover) before individuals from captive zoo populations were reintroduced into native habitats by teams

[6] The IUCN's list of Extinct in the Wild (EW) species currently hosts 78 species (39 animal and 39 plant). The EW list grows and shrinks as new species are added to the list or removed. Removal from the list either marks that the last representatives of the species have died in captivity, or that the species has been reintroduced back into native habitat, reestablishing a wild population.

of conservation actors. The majority of the conservation actors and the organizations that were the focus of this research, fall into this 'field conservation' category of conservation activities.

WHY ZOO CONSERVATION?

As has been outlined above, the philosophies and body of practices that are contained within the moniker of 'conservation' are varied, historically situated, and reactive to environmental change. As related to the people and work of zoological institutions, my research intends to show how this body of conservation philosophies and practices are related to an ongoing transition in the wider field of conservation.

With a few case exceptions, mainstream conservation practices have historically maintained an internal logic and ethics which prioritized 'preservationist norms in governing in-situ[7] conservation efforts' (Minteer and Collins 2012). Conservationists' roles and responsibilities were understood, at least by the conservationists themselves, to be about distanced protection and stewardship of native ecologies through protected areas management, while actively excluding non-conservation related activities and access to protected areas (see: fortress conservation, Doolittle 2007). This philosophical orientation of "generally accepted understandings of wildnerness, nativeness, and idealized "pristine" systems free from human control and management" (Minteer and Collins 2012) continually delineated what 'counted' as nature, what 'deserved' to be preserved, and— importantly for this research—in what form and by what means.

As species are increasingly at risk of extinction, more and more conservation organizations – and importantly the individuals who comprise them – are grappling with a

[7] in-situ meaning place-based or in-place

future that is uncertain and with a body of 'mainstream' philosophies and praxis that are increasingly insufficient for maintaining species and ecologies into the future.

A focus on field-based zoo conservation activities is a window into facets of these shifting philosophies and practices. With habitat loss and looming extinctions comes a reaction to those changes: a movement away from the notions of distanced conservation activities and "preservationist norms of in-situ" efforts, and towards increased *interventionism*. These more-interventionist approaches to wildlife, habitat, and landscape conservation efforts have achieved varying degrees of acceptance into 'mainstream conservation' over the last few decades as environmental change has accelerated (Minteer and Collins 2012, Buscher and Fletcher 2020). But to a large degree these 'hands-on' interventionist approaches remain closely connected to and often seated directly within the increased share of conservation programming undertaken by zoological institutions (e.g. zoos, aquariums, and botanic gardens).

So in order to study the people and practices that comprise this body of increased interventionism, it was productive to seat my ethnographic research within zoological institutions, their partner organizations, and among the individuals who are shaping and enacting contemporary conservation activities in the context of the current ecological moment and uncertain ecological futures.

RESEARCHER POSITIONALITY

Early in my graduate education I sat in a seminar room with Human Geographer and political ecologist Dr. Betsy Beymer-Farris as she described the importance of understanding and embracing 'researcher positionality'. She argued that leaning into positionalities was one step along the feminist science spectrum and a practice of moving

away from the lineage of 'scientific objectivity' that seeks to remove or alienate the researcher from their work. Instead, she asked us to craft a positionality statement of our own. A practice that encouraged us, as junior scholars, to be reflexive about our own values, ethics, and motivations; those aspects of our identity that we would inevitably bring with us into any work that we might undertake. A researcher's identity is always wrapped-up within the questions they pose and the research they undertake, and rather than being perceived as an invalidating bias, it should be intentionally put on display so that the audience for that research may have greater context for how it came to be.

As a kid I was always happiest knee deep in a creek or a pond in the suburbs north of Atlanta where I was raised, usually carrying a net or container to see what creatures I catch and examine. Growing up I kept all manner of animals as pets: fish, snakes, salamanders, newts, crabs, lizards, turtles. When I was 16 I began working in animal hospitals and would continue to do so as a veterinary technician through my mid-twenties. As a teenager and young adult I was happiest hiking, camping, traveling, and always when among animals. I came to the discipline of anthropology on the heels of my bachelors studies in English and Literature, largely because I found myself writing about and exploring the cultural contexts for literary works. But also there always seemed to inevitably be a theme of nature and environmentalism in my academic interests. Leading me to complete a bachelors in four-field anthropology and eventually move on to graduate training.

While my dissertation field research takes zoological institutions as its heart, like many of the zoo-adjacent[8] conservationists with whom I worked during those 13 months,

[8] See "Important Terms" section in this chapter.

I have a complicated relationship with zoos, aquariums, and their priorities. The crux of my ethical conflict with zoos and aquariums centers around their core historical practice of keeping animals in captivity for entertainment. As it stands, I do not have a totalizing position on the matter; there is variation. For example, I am broadly cautious of the idea of keeping animals in captivity strictly for the purposes of human entertainment, but accepting that this is an established practice (and that I myself have in the past and continue to have small exotic animals as pets), there are some animals that I do not think can be ethically housed in the vast majority of captive settings. Namely those that are large, highly intelligent, highly social, and in their native habitats, highly mobile. In this category are large aquatic mammals and fishes like porpoises, whales, and whale sharks (e.g. dolphins, orcas, belugas), as well as terrestrial megafauna (e.g. elephants, large felids), and many primates or great apes. I share perspectives with some of the research participants from this work, and if I were to have an ideal future for zoological institutions, it would be to see a complete reconfiguration of their core missions towards applied conservation action.

Additionally, scholars like Shoreman-Ouimet and Kopnina (2016) describe a wide spread 'anti-conservation' sentiment among anthropologists and social scientists. Understandably so, as much harm, marginalization, oppression, and exclusion have occurred across history and global contexts in the name of 'nature conservation' which is so often facilitated and carried out by environmental actors and organizations with disproportionate influence and power. But also, I believe we can carry with us that history of critique and contemporary skepticism, while we mobilize our ethnographic praxis to identify conservation practitioners with whom we share ethical overlap. 'Conservation' is a massive umbrella moniker, under which an incredible diversity of people, organizations,

and activities are subsumed. As we move forward into futures characterized by accelerating socio-ecological challenges, I hold the position that anthropologists and other environmental social scientists must not allow our histories of conservation critique to isolate us from identifying novel paths and partnerships forward that simultaneously advocate for human and environmental equity.

Finally, I am a cis-gender, white man from an upper-middle class family in the United States. In addition to my advanced academic training in the social sciences, I have applied training in animal medicine, physical/natural sciences and conservation. These identity categories and body of experiences often facilitated a smooth transition into conservation spaces that were largely comprised of other cis-gendered/white/university educated individuals, allowing me to assume active participation roles within organizations and work as a volunteer staffer during field research stints.

A FEW IMPORTANT TERMS

While conducting this field research and during writing it became productive to distinguish between two groups of conservation actors and practitioners, with whom I worked. I came to call these two groups 'Zoo-Based Conservationists' and 'Zoo-Adjacent Conservationists'.

Zoo-Based Conservation(ist): These activities and associated group of actors are those that are seated squarely within zoo institutions and whose background, training, and current positions are closely associated with the traditional roles and experiences of zoo staffers. They are the people whose trainings are in zoology and zoo sciences and have served in career roles as zoo keepers and curators before moved into positions that feature conservation activities.

Zoo-Adjacent Conservation(ists): This group of actors and the activities therein is the more expansive of the two groups. This category of zoo-adjacent practitioners are those who are exactly that, adjacent to zoological institutions. The primary distinguishing factor lies in their position within the field and their training. They are actors whose background and training lie outside of the traditional zoo field. They are conservation biologists, ecologists,

and other scientists whose experience is primarily within advanced academic training and applied fieldwork. Rather than coming-up through zoo institutions and eventually coming to work in conservation contexts like 'Zoo-Based' actors, they are conservationists by training who subsequently came to work at zoological institutions or at other organizations in close partnership with zoos.

In-situ: In-situ conservation activities are those that work towards the conservation of ecosystems and natural habitats and the maintenance and recovery of viable populations of species in their natural surroundings.

Ex-situ: Ex-situ conservation is the technique of conserving species outside their natural habitats through different techniques like zoo, captive breeding, aquarium, botanical garden, and gene bank.

Reintroduction/Repatriation/Translocation: Conservation activities that are defined by the "moving of species"; either from captive settings, where they were born, into native habitats, the 'repatriation' of animals back to their home countries or regions, or the transfer of wildlife from one region to another. All undertaken in order to stabilize, reestablish, or increase *in-situ* animal populations that have suffered significant decline, extirpation, or extinction in the wild.

FIELDWORK AND FIELD SITES

My fieldwork took place during 2018 and 2019. However, it might be more accurate to say that elements of my research process—most especially familiarity with conservation techniques/processes, and my own particular non-social science skillsets—began back during my time as an undergraduate at Kennesaw State University in Georgia. Here I taught ecological field techniques, interned at environmental organizations, and worked as a veterinary technician. During my time in the field from July 2018 until August 2019 I drove thousands of miles and conducted research activities in six states: Colorado, New Mexico, Georgia, Washington, Illinois, and Florida.

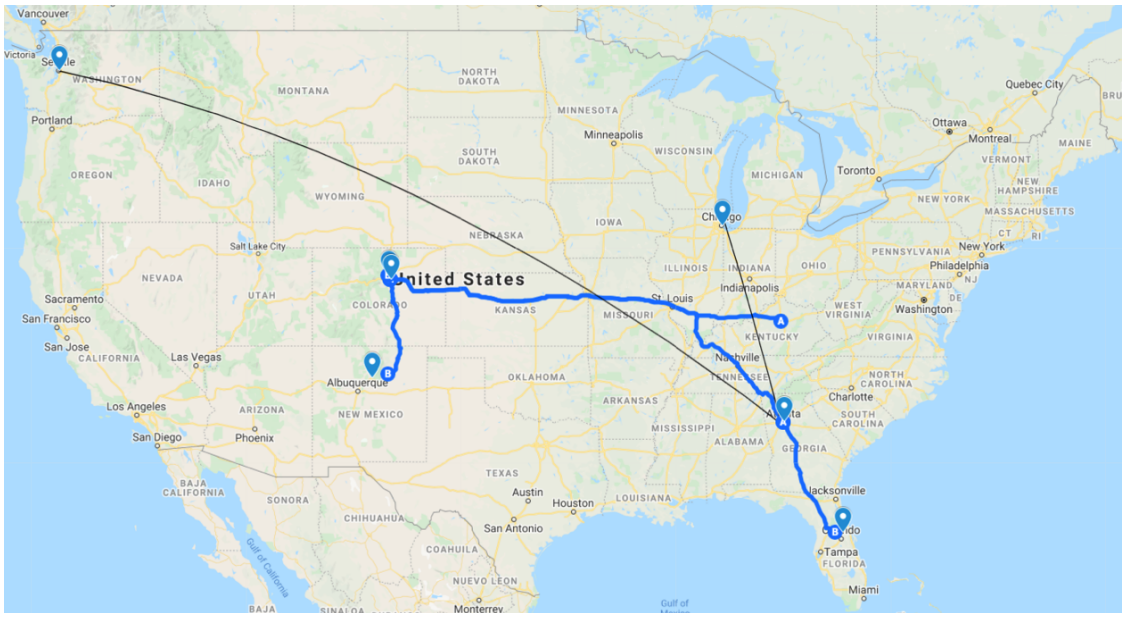

Figure 1.1 *Map of Research Travel (2018-2019)*

In total, I conducted research from within four primary organizations: the Denver Zoo (Denver, Colorado), the Butterfly Pavilion (Westminster, Colorado), the Atlanta Botanical Gardens (Atlanta, Georgia), and Central Florida Zoo's Orianne Center for Indigo Conservation (Eustis, Florida). In addition, I attended the Association of Zoos and Aquariums' Annual National Meeting (Seattle, Washington), the International Union for Conservation of Nature's 2nd International Wildlife Reintroduction Conference (Chicago, Illinois), and the Integrative Conservation Conference (Athens, Georgia). Data from this multi-sited research were derived from participant observation, formal interviews, informal interviews, public talks/presentations, and archival/document research.

Denver Zoological Foundation's Field Conservation Department (FCON) - Denver, Colorado –

I undertook field research with the Denver Zoological Foundation (Denver Zoo)'s Field Conservation Department (FCON) across two summers, in 2018 and 2019. The Denver Zoo, located inside Denver's downtown City Park, began life as the 80-acre Denver

Zoological Gardens in 1896. It transitioned to become the 'Denver Zoo' with the opening of Bear Mountain in 1918 (the first exhibit in the U.S. to use Carl Hagenbeck's philosophy of naturalistic enclosures) to house a Black Bear cub that was gifted to the city's Mayor. The zoo grew throughout the 20th century as a typical zoo until in the mid-1990's. In partnership with the Gates Family Foundation and Colorado Division of Wildlife—the zoo opened the Gates Center. Beginning in 1996 the Gates Center housed the newly created Conservation Biology Department, which was an applied research and conservation department founded and headed by Dr. Rich Reading (interviewed during this research). The following year in 1997, Rich would hire Dr. Brian Miller (interviewed during this research) and together they would grow the department's programming and staff until Brian's departure to become the Founding Scientist of the Wind River Ranch Foundation in 2005 (which would eventually become Rio Mora National Wildlife Refuge: Chapter 5) With Rich's departure in 2015, the Denver Zoo's Executive Board hired Dr. Graeme Patterson, formerly of the Wildlife Conservation Society, in 2016 as the VP for Field Conservation. Under Graeme the department would be renamed as the Field Conservation Department, and its staff of 18 would focus on field-based conservation 'action' programming in five key regions: Vietnam, Mongolia, Peru, Botswana, and the Rocky Mountain/Great Plains of the U.S. While I met and conducted interviews with the majority of FCON staff during my first period in 2018, I primarily spent my time working for the Rocky Mountain/Great Plains staff (and the staff of their organizational partners) on their projects. This entailed a visit to Rio Mora National Wildlife Refuge in 2018 to observe and interview staff, as well as working closely alongside Conservation Outreach Coordinator

Erica Garroutte and Citizen Science Field Technician Brad Schrom on their projects, in 2019, the Front Range Pika Project (FRPP) and Colorado Corridors Project (CCP).

Butterfly Pavilion
- Westminster, Colorado –

Following my time with the Denver Zoo Field Conservation Department in summer 2018, I had the opportunity to observe conservation work and conduct interviews with the staff of the Butterfly Pavilion in Westminster, Colorado. Following his departure from the Denver Zoo, Dr. Rich Reading would take the position of Director of Research and Conservation at the Butterfly Pavilion; an AZA accredited invertebrate zoo and conservation center. They have domestic and international research and field conservation projects that focus on inverts and pollinators (Colorado), reduction of human-wildlife conflict through bee-fence initiatives (Nepal and Tanzania) , Parnassian Butterfly assessment (Mongolia), and a coastal dunes invertebrate inventory in northern California. I would spend just a few short weeks working on a daily basis at the Butterfly Pavilion, where the majority of my efforts were on observing aspects of their local programming/projects and conducting interviews with conservation affiliated staff.

Atlanta Botanical Gardens
- Atlanta, Georgia –

In this fieldsite, I observed, interviewed, and worked with the staff of the Atlanta Botanical Gardens in the early fall of 2018. The Atlanta Botanical Gardens (ABG) are situated in downtown Atlanta, Georgia. The gardens opened in 1973 on the edge of Piedmont Park and have grown over the intervening four and half decades to become a 30 acre urban botanic garden in the heart of the city. I worked with ABG specifically because earlier that year, in May of 2018, the Gardens successfully ‘repatriated’ a group of

genetically significant frogs back to their native country of Panama in Central America. This repatriated[9] group was comprised of two species, *Anotheca spinosa* (Coronated Tree Frog) and *Agalychnis lemur* (Lemur Leaf Frog). All of the individual frogs who were repatriated descended directly from animals that were wild-collected from native habitats in Panama in the early 2000's during the first waves of the Chytrid fungus disease (Atlanta Botanical Gardens 2020). The botanical gardens has a distinct and growing conservation and research department, headed by Dr. Emily Coffey, that is dedicated to plant species and habitat conservation. However, the Amphibian program is a sort of remnant project from the early 2000's that is separate that is run by Amphibian Program Coordinator Chelsea Thomas and is the only animal conservation project at the botanical gardens. While I conducted interviews with Dr. Coffey and Ron Determann (the now-retired Vice President of Conservatories who oversaw the amphibian project), and had numerous informal conversations with other members of staff, the majority of my time was spent working directly alongside Chelsea.

Central Florida Zoo's Orianne Center for Indigo Conservation
- Eustis, Florida -

I spent the late winter and early spring of 2019 working with the staff of the Central Florida Zoo's Orianne Center for Indigo Conservation. The OCIC, which was named for its founding organization (The Orianne Society), was opened in 2012 in Lake County, Florida. The OCIC is a 25 acre property on the edge of the Seminole State Forest, and is the only conservation facility in the world dedicated to the housing, reproduction, rearing

[9] *Species Repatriation* is defined as returning or releasing individuals of a species back to an area that they historically occupied within their native range (Dodd and Siegel 1991). In the particular example of the Atlanta Botanical Garden, 'repatriation' refers to the returning of individuals back to their country of origin; Panama.

and eventual reintroduction of the threatened Eastern Indigo Snake (*Drymarchon couperi*). Founded by the Orianne Society (located in south Georgia), the facility's funding and operational management were assumed by the Central Florida Zoo and Botanical Gardens of Sanford, Florida in 2014.

Reintroduction activities for the Eastern Indigo Snake are guided by the Eastern Indigo Snake Reintroduction Committee. The Central Florida Zoo's Orianne Center for Indigo Conservation and partners currently have two reintroduction sites in the southeast: Conecuh National Forest in Alabama and Apalachicola Bluffs and Ravines Preserve in northwestern Florida. June 2010 marked the first release of captive raised animals into the Conecuh National Forest in southern Alabama. With the additional release of 15 individuals in May of 2019, a total of 170 Eastern Indigos have been reintroduced into Conecuh since the project began (Forest Service 2019). Apalachicola Bluffs and Ravines Preserve, a preserve managed by The Nature Conservancy, was a more recent addition to the reintroduction project. The Eastern Indigo was last seen in ABRP in 1982. The ABRP is found on the east bank of the Apalachicola river and is a 6,300 acre preserve approximately 60 miles west of Tallahassee in the Florida panhandle (FMFW 2020). The release of 15 individuals on June 11th, 2019 marked the third year of reintroduction releases in ABRP (Virata 2019).

The Central Florida Zoo's Orianne Center For Indigo Conservation has a secondary conservation project that is also housed at the facility. The OCIC is involved in a program to reproduce and rear the Striped Newt (*Notophthalmus perstriatus*) in captive settings and reintroduce these amphibians into native Florida habitats. Much like the Indigo Reintroduction program, the OCIC acts as a node within the network of this larger project,

with their specific role being the breeding and raising of animals for release. The project partners include the Jacksonville Zoo (also a breeding/raising node), Florida Fish and Wildlife, US Forest Service, a number of environmental organizations that are part of the broader Striped Newt Working Group, and The Coastal Plains Institute that founded the repatriation effort.

Association of Zoos and Aquariums National Conference
- Seattle, Washington –

In September of 2018 I traveled to Seattle, Washington for the week-long Association of Zoos & Aquariums (AZA) Annual Conference. Held by the accrediting body for North American zoological institutions, this conference brought together almost 3,000 attendees from across North America for a week of events and presentations. The AZA is an independent organization [501(c)3] with multiple roles in the zoo and aquarium field. First and foremost, they are an accrediting body that represents over 230 facilities that meet their standards of care, education, science, conservation, and recreation. Secondly, the AZA is a granting organization, which according to their records, has provided $7.7 million to date, in support of 400+ projects across the world. The AZA also reports that accredited zoo and aquarium institutions annually spend $230 million on field conservation projects in support of 800+ species in 130 countries (AZA Conservation 2020).

International Union for Conservation of Nature's
Wildlife Reintroduction Conference
- Chicago, Illinois -

In November of 2018 I traveled to Chicago, Illinois in order to attend the International Union for Conservation of Nature's (IUCN) 2nd International Reintroduction Conference, which was being held at the Lincoln Park Zoo. This conference brought

together a couple of hundred attendees from diverse conservation backgrounds to present on their experiences of wildlife reintroductions for conservation purposes. The IUCN refers to itself as "the global authority on the status of the natural world and the measures needed to safeguard it" (iucn.org). Their mmember union comprises 1,300 government and non-government member organizations and over 15,000 individual "experts" active in 160 countries (iucn.org). The IUCN is organized around topical 'commissions' that "inform IUCN's knowledge and help produce its work." These commissions include the CEM (Commission on Ecosystem Management) and the WCEL (World Commission on Environmental Law), among others.

While the conference was broadly supported by the IUCN SSC, it was more specifically organized by the (then named) IUCN SSC Reintroduction Specialist Group (RSG). The SSC CTSG describes itself as a specialist group "working to face emerging threats, battle against extinction, restore species, and thereby yield wide-ranging benefits for nature and people" (iucn-ctsg.org). According to the CTSG, conservation translocations can been "proactive" or "reactive." Proactive translocations can intervene to attempt to avert an extinction event, while reactive translocations can post-hoc return species that had been lost regionally.

This 2018 conference was the 2nd international conference on reintroduction, with the first convening 10 years earlier in 2008. This event, and its attendees, presented a particularly interesting convergence of individuals and organizations. This conference was organized by the conservation wing of an enormous international environmental organization (IUCN) and hosted at a U.S. zoological institution. However, it was also

attended by a varied selection of conservation actors from federal and state agencies, international non-profits, NGO's, as well as, international zoos and aquariums.

RESEARCH POPULATION

As I discussed previously, within anthropological research and literature on conservation activities there has long been a disciplinary convention which tends to eschew ethnographic focus on conservation actors as people—instead favoring more limited inclusion which treats professionals as elite technical experts, rather than as complex social actors. Functionally, this treatment results in a dearth of context in regards to the lives, experiences, decision making, motivations, etc. which are integral to crafting a more informed understanding of broader conservation realties. An important aspect of this expanded ethnographic treatment of conservation*ists* is an inclusion of professionals' identity and social characteristics.

With the exception of just three research participants, the professionals within my research population were overwhelmingly white, which reflects a wider realty within the environmental arena and conservation field, that have long been dominated by white professionals. The gendered distribution of total participants was approximately 50%/50% men to women, but at the level of organization executives there was consistently an over representation of men; with approx. 80+% of management positions being held by white men. A majority of participants held post-secondary degrees, ranging from Bachelors to Doctoral credentials. With one organization standing as an outlier, in that the majority of its staff (including its Director) came to their conservation positions through field experience, and did not hold post-secondary degrees.

While the above characteristics generally reflect established trends within the professional conservation arena, two categories stood out as divergent from typical characterization of conservation actors: 1) economic and 2) geographic insider/outside status. In the literature on transnational nature conservation there is a consistent representation of conservation actors as being 'economic elites' and 'outsiders' pushing international environmental agendas. However, this characterization did not hold true when investigating conservation*ists* living and working in the United States. In reality, a significant number of professionals included within this project were 'locals' – working in localities or regions where they were 'from'—and many of them were economically lower-middle and working class. Thusly, much of the conservation programming being undertaken was designed and enacted by populations of professionals who are neither economically elite nor geo-political outsiders—prompting a reassessment of the calculus of power and social relations that are at play in this broader field of conservation activities.

METHODS

During my fieldwork I conducted 34 formal interviews with 25 individuals at those four primary organizations[10]. I was often working alongside conservationists in their day-to-day activities for weeks or months at a time (sometimes for 6 or 7 days out of the week). The practice of counting individual 'informal interview' instances is not a particularly meaningful one.[11] Of the 25 individuals with whom I conducted formal interviews, I also conducted informal interviews with 13 of them. Beyond those, I conducted informal

[10] Multiple formal interviews were conducted with the Directors of each organization/program.

[11] My research period with the Orianne Center in the Spring of 2019, I worked with the same small staff of conservationists between 3 and 7 days a week. Over that time it is feasible that I may have conducted informal interviews with just one staff member that easily number more that 20+ . For that reason I will count the number of individuals.

interviews with a further 22 individuals (n=35). It is pertinent to note that all formal interviews were conducted with individuals who worked within the four primary case-study organizations, while informal interviews accessed a wider range of individuals in different roles and positions during my fieldwork. In addition to formal and informal interviews, I collected data from 25 public and/or professional talks and presentations. I attended and observed many more over that year (~50), however these 25 were the most substantive and pertinent to this research.

In terms of participant observation, the majority of my efforts (in regards to time) were focused on the small teams of practitioners who were directly involved in the on-the-ground aspects of conservation programming. In this context, my ideal scenarios were those in which I was able to "work for" these organizations as a volunteer member of staff, and share in the daily tasks of the programs. This model is described in more detail below. Participant observation activities varied between the different organizations and/or sites and looked different based on the whether the site was a condensed or extended ethnographic case. Condensed research cases typically lasted for a matter of weeks, extended periods lasted for multiple months. The Denver Zoo's Field Conservation Department and the Central Florida Zoo's Orianne Center were extended cases, while the Atlanta Botanical Gardens and Butterfly Pavilion were condensed.

Denver Zoo
Field Conservation Department

Following an initial research period with the Denver Zoo's Field Conservation Department in summer 2018, in summer 2019 I worked as a Field Assistant for the Rocky Mountain/Great Plains program. This role meant that my daily activities were divided between program planning meetings, week-long backcountry wildlife/habitat data

collection trips, day-trips to collect wildlife camera-trap data, classroom training events for citizen science volunteers, site scouting trips, and citizen science field training days where I taught data-collection procedures to members of the public. Additionally, when on the Zoo's campus I sat in on department meetings, presentations, and "All Staff" meetings. (My first summer was primarily focused on conducting formal interviews, but also included working on many of these projects, in a lesser capacity. That summer I also sat in on department meetings as well as meetings conducted by the FCON Director. In addition to my trip to Rio Mora National Wildlife Refuge). Ultimately it was my work in the summer of 2018 that facilitated Erica Garroutte to invite me back as a Field Assistant.

The Central Florida Zoo's OCIC

At the Central Florida Zoo's Orianne Center for Indigo Conservation, I primarily worked in a capacity similar to an animal care intern/volunteer staff. My day-to-day activities were comprised of assisting the small team with most details of caring for and raising Indigo Snakes and Striped Newts for breeding and the eventual reintroduction (e.g. cleaning, feeding, documenting, medicating). Beyond animal care activities with staff, I attended staff meetings, sat in on private meetings, observed tours, attended working group meetings, and travelled to Sanford for medical procedures at the main zoo campus. In addition to my central volunteer responsibilities in animal care, I also took up a role as a volunteer for the public outreach team. During my time with the OCIC in 2019 I helped run the Center's education and animal exhibition booth at numerous community events across central Florida and southern Georgia.

Atlanta Botanical Gardens & The Butterfly Pavilion

At the Atlanta Botanical Gardens I was primarily working with staff on daily animal care tasks in the "amphibian lab" alongside the Amphibian Program Coordinator, Chelsea Thomas. Beyond animal care (e.g. daily feeding and cleaning) I was able to observe public presentations by the amphibian and horticultural staff, as well as participate in indoor releases of frogs from the lab into the Garden's conservatories. At the Butterfly Pavilion I sat in on meetings with community partners, observed educational outreach programs, and assisted with data collection in Boulder County to assess the presence of endangered the Endangered Emerald Butterfly in Alpine Ponds.

Multi-Sited Research Structure

As listed above, my project design and resulting field research were multi-sited—spanning 13 months, six states, 4 case-study organizations, and multiple professional conferences and meetings. Yet even beyond this, the delineation of those 4 organizations is a simplification; contained within each of these organizational 'sites'—and even the professional meetings—were many more additional social and physical/geographic locations across which their work was undertaken. This ultimately meant that my research practice followed this diffuse structure. Interestingly, this echoes early discourse within anthropology about the adaptation of long-standing modes of research away from single-site/local ethnography, as a practical necessity in efforts to examine increasingly "complex objects of study" through the anthropological endeavor (Marcus 1995). The multi-sited structure of this research came about for a few different reasons. First, was my desire to incorporate what Crate (2011) calls a "cross-scale, multi-stakeholder" research practice to address questions that pertained to the influence of actors and ideas at different scales of

participation. Second, was to address how to sample a diversity of programmatic approaches to conservation activities and professionals' experiences within the category of zoological/zoo-adjacent conservation. Third, a multi-site approach was necessary because of issues of access. Gaining access to conservation organizations, as an external researcher interested in the conservation*ists* as much as their conservation programs, was a barrier to entry. I will discuss below my approaches to fieldwork with these organizations, but even with those approaches employed I encountered upper limits in regards to how much extended access these organizations were comfortable or willing to give me. As such, my fieldwork structure was a result of balancing the methodological needs of examining multiple organizations and the practical realities of limits upon research access. As it was my desire to conduct research on (and from *within*) these conservation organizations, it was incumbent upon me to work within their parameters and adapt modes of ethnographic practices to operate within their existing frameworks.

"Working for" as a Field Research Practice

Scholars have discussed and employed what they describe as an 'apprenticeship' method of data collection, within their ethnographic processes. While certain aspects of this ethnographic practice apply to my personal fieldwork experience, it does not precisely align with my research practice. For me, apprenticeship evokes imagery of a novice learning new skills from a skilled practitioner, working and learning alongside a master of craft. (I am thinking in particular of the work done by Anthropologist Pierce Locke (2017), who apprenticed himself to elephant trainers in order to experientially investigate human-elephant relations). While my ethnographic process did heavily rely on working alongside conservation actors in their day-to-day activities, it is less accurate to say that I apprenticed

myself to them. It is more precise to say that I leveraged dimensions of my existing skillset, in order to facilitate a more contextually appropriate reason for my presence in their world. Within my multi-sited fieldwork, my most successful experiences were those in which I was able to 'jump in', learn the daily routine, and get to work. This made my presence, and the potential awkwardness it might cause, less of a point of contention[12]. It became clear early on in my fieldwork that if I wanted to maintain access within these small organizations and with their relatively small teams of staff, I needed to be useful and unobtrusive. Maybe more importantly, I needed to fit my presence as a researcher into an existing category for the conservationists I was working alongside and observing. My presence needed to be, at best, an asset and at minimum not a distraction.

During my months with the Central Florida Zoo's Orianne Center for Indigo Conservation, this meant leveraging a few of different skills. Falling into three categories, these were 1) general knowledge of reptiles, reptile husbandry, biosecurity protocols and animal medicine; 2) knowledge of aquarium life-support systems and amphibian husbandry for the Striped Newt breeding program; 3) past work in community outreach and environmental education, to aid with numerous public events.

During my two summers with the Denver Zoo's Field Conservation Department, I needed to leverage slightly different skill sets in order to be useful. In fact, I was told by FCON staff that it was my willingness to assist in the field work and my skills in doing so in summer 2018 that resulted in their extending an invitation for me to work as a summer field assistant in 2019. Across these two summers I primarily worked on two projects, the

[12] It is relevant to note that this model had varying degrees of success that shifting at different times, even within the same organization. A feature that I observed in conducting ethnographic research with individuals trained within scientific fields was increased awareness on the part of those individuals to my presence as a researcher as well as a volunteer.

Front Range Pika Project (FRPP) and the Colorado Corridors Project (CCP). In the FRPP I was involved in two primary aspects: first was conducting backcountry site visits and second was assisting in planning and executing citizen science training events. In these capacities, I was able to employ past training in habitat and wildlife survey techniques.

OVERVIEW OF DISSERTATION

Chapter 2 focuses on the ongoing discursive and rhetorical (re)shaping of contemporary zoological institutions (zoos and aquariums) into "conservation organizations". I examine the tensions among practitioners over the conceptual and practical definition of 'conservation' and the future of roles for conservation*ists* amidst environmental change. This ethnographic chapter begins by drawing on the data from two events. First, I attended the Association of Zoos and Aquariums Annual Meeting in 2018 hosted by the Woodland Park Zoo and Seattle Aquarium in Seattle, Washington. Second, I attended the International Union for Conservation of Nature's 2nd International Wildlife Reintroduction Conference in 2018 hosted by the Lincoln Park Zoo in Chicago, Illinois. Additional exploration in this chapter comes from conversations between myself and executive leaders of conservation departments at case-study organizations. As a manifestation of this research's intention to attend to actors' positions within the field or scale of influence in shaping conservation, there is an emphasis in this chapter on the language and perspectives communicated by senior individuals within the field and those at the 'executive' level of organizational bodies. The data in this chapter highlight the ongoing processes—on the part of zoological institutions—to simultaneously reshape themselves discursively *and* practically into conservation organizations dedicated to "saving species in the wild". It also examines contention over the very definition of

'conservation', the composition of 'nature', and the anxieties experienced by conservationists about their roles in the midst of environmental change.

Chapter 3 explores the experiences of increased interventionism in conservation through the relationships between conservation practitioners and the animals in their care, as representatives for their species and as extensions of the 'wild'. This ethnographic chapter draws on extensive participant observation, interviews, and conversations conducted in 2019 while working alongside conservation actors at the Central Florida Zoo's Orianne Center for Indigo Conservation facility in Eustis, Florida. This chapter shifts its attention to scale away from the senior and executive figures examined in Chapter 2, and instead provides a window into the experiences of a small team of on-the-ground practitioners who are responsible for the day-to-day activities that facilitate the reintroduction of a threatened species back into its native habitat. This chapter explores how conservation practices that blur the lines between *ex situ* and *in situ* approaches are experienced by zoo-adjacent conservation professionals through the lens of the 'wild'. This chapter understands ex-situ conservation activities as being connected to practitioners' care for the 'wild' and native ecologies as they observe and assist the animals in their care along a 'captive-to-wild continuum'.

Chapter 4 interweaves ethnographic data from multiple field sites as well as archival and document research as it examines the features and influences of various axes of scientific knowledge politics on contemporary conservation activities. Drawing from an admixture of data sources from different sites and programs in Colorado and Florida, this chapter explores three manifestations and related conflicts of scientific knowledge politics: 1) native-ness and patchwork conservation, 2) politics of vulnerability and listing under the

Endangered Species Act, and 3) taxonomy and conservation implications. This chapter first examines the material implications when competing definitions of "native-ness" shape a "patchwork conservation landscape"; through the lens of the western Mountain Goat (*Oreamnos americanus*). It then explores the conflicts associated with attempts to secure "listing" for species under the U.S.'s Endangered Species Act. Then finally it examines the real-world implications of taxonomic reclassifications, when those reclassifications potentially effect state and federal conservation statuses of threatened species.

Chapter 5 is an examination of the 'complex contextual realties of conservation professionals'—with particular analytical emphasis on the 'webs of relations' that shape conservation activities. This chapter, which is based on ethnographic research at the Rio Mora National Wildlife Refuge in New Mexico and in Colorado, draws on the ideas and experiences of the small team of conservationists who were involved in the creation of the Refuge along the Mora River and/or who are responsible for its current operations. Among others, this chapter is influenced by Larson and Brockington (2018) and their call for environmental social scientists to acknowledge the dynamism and "complex web of relations and networks" that comprise contemporary conservation organizations and their activities. This chapter explores those contextual realities through examinations of the Refuge's creation, as well as the unique composition of its multi-partner management structure.

Chapter 6 is an Executive Summary of this Dissertation written for more general, non-anthropological, audiences.

Chapter 2: Ecological Change and Conservation Transformations

The 2013 United Nations IPCC Fifth Assessment Report documented global temperature averages having increased by 0.85°C (1880-2012), a 19cm average rise in sea levels (1910-2010), and continual reduction in Artic sea ice since 1979 (UNIPCC 2013). As of the summer of 2020, the International Union for the Conservation of Nature's (IUCN) Red List of Threatened species documented that 27% of all species assessed by the IUCN are designated as threatened with extinction. That amounts to more than 31,000 species out of approximately 116,000 species across taxa being categorized as either Vulnerable, Endangered, or Critically Endangered. The IUCN identifies that the primary threat to 85% of the species listed is loss of native habitat (IUCN Red List Update 2015). Also in 2020 the United Nations' Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) released their Global Assessment. In their report they called for 'transformative changes' in the face of global environmental changes. The report documents a 30% reduction in global terrestrial habitat integrity, 9% of global species without sufficient habitat for long-term survival, 25% of total global species across taxa threatened with extinction, 40% of all amphibian species threatened with extinction, and the large scale global extinction potential for nearly 1,000,000 species in the relatively near future. (UN IPBES 2020)

In the introduction to their 2020 publication, Brüscher and Fletcher argue for a recognition that a "revolution in conservation is brewing." Intoning that "[e]ven a cursory glance at conservation debates over the last decade show that pressure on species and ecosystems – and hence the conservation community concerned with saving them – are

extremely high and certain to further increase" (2020:1). The authors additionally reflected on the reality that a discipline such as conservation biology has always been a reactive 'crisis discipline'. The intensification of the 'anthropocene' within the physical sciences and the anxieties around its accelerating global ecosystem changes, there is are also potential 'radical' transformations in conservation actions on the horizon.

Yet, like so much social scientific discourse and analyses surrounding conservation activities (especially those focused on studies of the 'neoliberalization' of transnational conservation activities: Brüscher and Fletcher 2020; Brockington, Duffy, and Igoe 2008) the recognition of those imminent conservation transformations are conspicuously absent of more direct engagement with the perspectives and experiences of conservation actors, themselves. Convention, instead, favors analyses that are conducted multiple steps removed from the actual people who shape and enact conservation activities—at best, often favoring examinations of articles and other media publications. Additionally, as Kiik 2018 noted in his call for greater attention to conservation professionals as ethnographic subjects, there remains over-emphasis in anthropological research on the transnational 'parks and people' (West, Igoe, and Brockington 2006) category of conservation activities. Which, while critically important, is just one category of conservation activities undertaken in the wider context of the 'anthropocene' and ecosystem alternations. As such, if anthropologists are motivated to truly understand the contours of contemporary conservation—either to interrupt in those actions that are problematic or participate in those with potential—it is incumbent to expand the scope of our investigations to include those underexamined activities and the people who enact them.

In 2018, Minteer, Maienschein, and Collins—scholars working at the intersection of environmental ethics and conservation—described how in the contemporary moment, "most biodiversity scientists and conservationists will tell you [we are living] in a time of profound ecological change" (2018:1). Like Brüscher and Fletcher (2020), the authors acknowledged the growing calls by some scientists for 'radical' protected area preservation proposals—like that of E.O. Wilson's "Half Earth" proposal (2016). However, in their volume, Minteer et al. committed to examining activities that lie outside of the scope of "mainstream conservation" models. They focus specifically on the past, present, and future role(s) of zoological institutions in the global efforts to "combat species extinctions, to protect habitats, and to in general to conserve biodiversity…" (2018:1-2). Minteer et al. rightly acknowledged how some critics of zoological institutions feel that treating these bodies as "legitimate conservation organizations is a cynical appeal to justify [these] anachronistic and exploitative" (2018:2) organizations. However, the authors argue that categorical or totalizing views—both for and against these institutions—are simplistic and do not "get us far in understanding [them] as conservation actors" (2018:2).

This chapter's central framework builds upon the ideas of Brüscher and Fletcher (2020), Minteer et al. (2018), and Kiik (2018). In it I argue that, while there are indeed 'radical' conservation proposals being presented to the world by people like E.O Wilson, through a more contextualized and humanized examination of conservation(ists)—and by expanding beyond the over-represented 'parks and people'[13] category—anthropologists are

[13] Importantly, the conservation activities (and the conservationists) within this chapter and dissertation are almost never uncoupled from the mainstream conservation practice of 'protected areas' as the dominant model for protecting habitats and ecologies. However, these actors should be understood as working in conservation spaces that would otherwise be poorly accessed through a typical 'parks and people' analytical lens.

better able to trace the contours of ongoing conservation transformations (and their contestations). Ultimately, through this chapter I argue for expanded ethnographic attention to how ecological (re)configurations are facilitating internal reassessments and interrogations of conservation values, goals, ethics and practices. This chapter illustrates some of those features through its recognition of two themes of conservation. First, are efforts to transform the identities (and practical missions) of zoological institutions into 'conservation organizations'. Second, are the transformations of conservationists' own ideas about—and relationships to—'nature', and to conservation interventions on natures' behalf in the face ecological alternations and species declines.

While on-the-ground case examples—centering more interpersonal ethnographic engagements between myself and conservationists—are presented in Chapters Three and Five of this dissertation, the data in this chapter derive from my efforts to investigate what could be learned by examining features of these institutions, professionals, and conservation transformations at the scale of their professional spaces, meetings, and discussions therein. In that regard, elements of this chapter are also in connection with the efforts of Brosius and Campbell (2010), in their recognition of the importance of applying anthropological research attentions to professional conservation conferences; what they termed 'event ethnography'[14]. Aside from visible organizational executives who more regularly communicate in public forums, conservation professionals often work in relative isolation or within insulated small teams. As my field research has shown, these insulated spaces can be difficult to access. As such, the conferences, meetings, and working groups

[14] Their efforts towards (Collaborative Event Ethnography or CEE) included 22 researchers (anthropologists and geographers) at the 13 day International Union for Conservation of Nature's (IUCN) Fourth World Conservation Congress (WCC) in Barcelona, Spain.

I attended during my field research were important opportunities to access a larger number of conservationists, while they communicated about their ideas and experiences in these professional spaces.

This chapter primarily draws from two separate events I attended in September and November of 2018. The Association of Zoos and Aquariums' Annual Conference in Seattle, Washington and the International Union for Conservation of Nature's 2nd International Wildlife Reintroduction Conference in Chicago, Illinois. While both of these events presented opportunities to examine conservation-related discourses among/between professionals (rather than between professionals and the public), these events ended up providing insight into two distinct arenas of 'transformation'. First, the AZA conference—which annually brings together thousands of zoo-professionals from AZA accredited zoological institutions in North America—was an opportunity to hear from influential 'executive level' decision makers working to transform the identities of zoological institutions into "conservation organizations." Second, the IUCN International Reintroduction Conference, offered an opportunity to listen and observe as (international) conservation practitioners grapple with the challenges presented by accelerating species threats, habitat declines, and ecosystem alterations; and what those mean for 'nature' and the body of philosophies and practices of conservation(ists) moving into uncertain ecological futures.

FIELDWORK AND METHODS

A feature of this project's research design—and the data included in this chapter's discussion—was an effort to intentionally incorporate what Crate (2011) refers to as "cross scale" research practices that would facilitate data collection and subsequent analysis of

actors participating in shaping conservation ideas and activities at different scales and with different degrees of influence.

My participation in these events facilitated access to a wide range of conservation actors attending and presenting, as well as opportunities to hear directly from executive level actors whose ideas and priorities shape the direction of highly influential environmental organizations. At these conferences, I attended dozens of sessions, panels, and talks that addressed conservation related topics[15]. I attended individual talks and panels and sought out presenters afterwards for further conversations. In addition to the planned sessions, I also attended nearly all social events related to the conferences/meetings: welcome events, coffee hours, cocktail hours, and field-trips/outings. These informal spaces provided opportunities to spend casual time with meeting attendees. It is where I had access to observe and participate in a range of conversations related to the field.

The predominant share of data that shape this chapter's discussions were derived from transcriptions of professional presentations and panels that I attended at these two events. When I was thinking through how to approach transcriptions that were the result of these formal presentations or semi-formal panels, I began to treat their analysis similarly to how I approach written text for textual analysis. I leaned into this treatment of the data because public presentations—while delivered orally like formal/informal interview responses—occupy a different context, social intentionality, and positionality within the professional discourse. These public presentations are extremely productive at providing insight into professional-to-professional speech, but they are of a different character than

[15] In context: At the AZA general meetings in Seattle, this meant specifically attending zoo-conservation related sessions; at the IUCN meeting in Chicago, all presentations were coalesced around conservation translocation interventions.

true ‘discourse’ that comes from every day conversation. The treatment of presentations-as-text situates them, instead, within a field of textual ‘messaging’ communication that SAGE describes as being “influenced by and reflective of larger social structures” that can also be understood to examine, challenge, or seek to influence those social contexts in which they are operating (SAGE 2017).

In addition to the data collected during these large gatherings of professionals, included in this chapter’s discussions are related themes and commentary from formal and informal interviews with conservation practitioners conducted during other portions of my fieldwork. These elements are interwoven where applicable to provide greater insight into the wider landscape of conservation, the experiences of conservationists, and conservationists’ conflicts over ongoing changes. Additional detail and context is provided from internet-based research of organizational resources, publications, and publicly available reports and media.

PARKING LOT CONVERSATIONS

One chilly, early morning nearly halfway through my field work, I was standing in a mostly empty parking lot in a mountain town with a few members of an environmental organization I was working for, at the time. We had arrived early and were waiting on the influx of the weekend’s volunteers for the wildlife monitoring project we would be working on. Most of the team-members standing next to our cars in a loose circle fall into the category of “zoo-adjacent” practitioners. These are mostly ecologists and biologists who were trained and conducted research out of zoos, before taking jobs with zoological institutions that hired them for their conservation skill-sets. At one point, the conversation shifted to those who were planning to attend a few upcoming conferences put on by the

Association of Zoos and Aquariums (AZA). When I mentioned that I had attended the previous year's AZA National Conference in Seattle, one of the landscape ecologists asked me why I would go to a big conference like that when I was interested in "*field* conservation"? With the insinuation that she understood that I was interested in what happens 'on the ground' and not just people talking about it. I chuckled and explained that I went because I was interested in how 'folks at the top' of these zoological institutions and organizing/accrediting bodies *talked* about conservation work. She laughed—a little darkly—at this. When I pressed her, she explained that in her view 'they [institutional admin] always talk a big game when it comes to conservation work.' However, she never quite felt convinced by the sincerity of their intent, or their likely long term follow-through. The others standing around in the loose circle nodded in agreement. She would mention later that zoo and aquarium board, along with these umbrella organizations have increasingly amplified their conservation rhetoric over the last few years. We briefly discussed how this is because zoos and aquariums *are* in fact funding and undertaking more conservation work, but *also* because they recognize that it is what the public wants to hear. Zoos and aquariums are indeed involved in increasing levels of conservation, though even within the zoo and zoo-adjacent contexts, the precise definition of 'conservation' varies widely and is contested by different actors.

Importantly, in my observation, much of this early morning parking lot conversation was underpinned by a recent internal study commissioned by the Association of Zoos and Aquariums and published the spring of 2018, just before I began my fieldwork. The study's results were explicitly and implicitly discussed at numerous points during my field research at multiple organizations including by some in the parking lot with me that

morning. During my time within these institutions, I continually made the observation that zoological organizations and the people that work within them are very attentive to public criticism and often discuss public perception and 'favorability' towards zoos and aquariums as a factor in their decision making. This 2018 publication contained the results of a public 'favorability assessment' that had everyone in the zoo field talking. In short, out of six factors the top two factors selected by respondents that would "improve [their] favorability" of zoological institutions were: 1) *Improving care of animals in zoos & aquariums* (4.53/5) and 2) *Working on saving animals in the wild from extinction* (4.41/5). Succinctly, increased captive animal welfare and increased field-based conservation activities are the two factors most likely to sway public opinion in the positive direction.

Association of Zoos and Aquariums Annual Conference
Seattle, Washington

In North America, the most rigorous and coveted accreditation for zoological institutions is granted by the Association of Zoo and Aquariums (AZA). Institutions that successfully maintain an AZA accreditation, according to AZA themselves, are held to the "highest standards of animal welfare, veterinary care, conservation, and education". Institutions undergo the full review and accreditation process every five years. According to the AZA, "fewer than 10% of the approximately 2,800 animal exhibitors licensed by the United States Department of Agriculture are AZA accredited" (AZA Accreditation 2020). During my field work, all but one of the organizations with whom I worked held AZA accreditation status (the exception was a Botanical Garden). Along with the designation of being an 'AZA institution', comes participation in the wider AZA "community"[16]. This

[16] The AZA leans heavily into this language of 'community'.

accreditation entails access to operational resources, collective knowledge sharing, funding opportunities, educational programming, as well as, enumerable committees and sub-committees dedicated to all facets of running a zoological institution. AZA accreditation also allows for participation in inter-organization breeding programs and animal transfers, stud-book inclusion/management, and different forms of conservation resources and programming. The Association of Zoos and Aquariums is an extremely influential actor in establishing organizational standards, as well as shaping the priorities, practices, and missions of zoological institutions in North America; simultaneously for organizations that hold their accreditation and for those that aspire to its standards and to access its resources.

Following my time working with the Atlanta Botanical Gardens in September of 2018, I traveled to Seattle, Washington to attend the Association of Zoos and Aquariums Annual Conference. The conference was co-hosted by two AZA member institutions, the Seattle Aquarium and Woodland Park Zoo, and was held at the Washington State Convention Center; a 15 minute walk east from the famous Pike Place Market on Elliot Bay. The AZA's annual conference is a national event that hosts nearly 3,000 Association members for a week of committee meetings, plenary events, conference presentations, and social gatherings. Significantly for my attendance, this conference is one of the few in-person opportunities to hear directly from the Association's leadership and executive actors as they communicate their positions, priorities, and goals for the association's member organizations.

Having primarily experienced medium sized academic sub-field conferences (e.g. 300-500 hundred participants), the AZA annual meeting was a different world in regards to scale. In particular, the 'general session' meetings were times when all participants

attended executive panels in a ballroom large enough to hold the thousands of meeting attendees. These were very much 'tone-setting' events where members of the Executive team and Board of Directors spoke to conference attendees, announced initiatives, and set association-wide messaging. This was all while standing on a stage brightly lit with vibrantly colored lights, seated on contemporary style white couches for 'casual chats,' and were constantly projected onto numerous floor-to-ceiling screens. My initial impression was that the feel of these general body sessions felt like a mix of Silicon Valley tech launch event and a contemporary U.S. mega-church Sunday service. All music, flashing lights, and hype. A year or so later I would relate this impression to an ecologist friend I made during fieldwork while we caught up during a phone call; she laughed and confirmed that the "silicon valley meets mega-church vibe" is *exactly* how she too sees these events.

"We are conservation organizations…"

Dan Ashe is the current President and CEO of the Association of Zoos and Aquariums. Prior to taking the top executive position at AZA in January 2017, Ashe was with the U.S. Fish and Wildlife Service for 22 years and served as its Director for nearly six years (2011-2017)[17]. He had previously held positions as the Chief of National Wildlife Refuge Systems (1998-2003) and Science Advisor to the Director of USFWS (2003) (Dan Ashe Bio 2020).

On the morning of the first day of General Session meetings I sat at a table near the back of the packed ballroom for the conference's welcome event. On the stage—80 or 90 yards from my table—Dan Ashe approached the clear plastic podium to begin his welcome.

[17] Interestingly, Ashe was the Director of the USFWS during the time that Rio Mora National Wildlife Refuge (the subject of Chapter Five) was designated as an official refuge.

Having only been active in his position as President for a little over year at this point, the 2018 meeting was likely the first time that many AZA members would be hearing directly from him. When Ashe's selection as President and CEO of AZA was announced in 2016, then Chairman of the AZA Board of Directors, Steven Burns (Zoo Boise), was quoted saying that *"hiring someone who understands that zoos and aquariums are centers of conservation was very important to us"* (AZA News Releases 2016) and Ashe himself stated in a press release that he, "*look[s] forward to the opportunity to help lead a community of organizations and professionals also known for scientific excellence and dedicated care for wildlife and the wild places where they live*."

Ashe's messaging during the 2018 meeting was arguably an opportunity to reinforce that conservation-forward perspective, for which he had been selected. Within the first couple of minutes of his welcome address, Ashe had this to say:

> "…regardless of size [what I see] is impressive and inspiring. I see dedicated, passionate professionals providing outstanding animal care to hundreds of species. So, **we are animal advocates**. I see **conservation organizations** which collectively invested more than 220 million dollars in field conservation in 2017 alone and will invest more than 1 billion dollars over the next 5 years. We are global con…<speech interrupted by outbreak of applause from audience>…Yes! **Collectively we are global conservation leaders**. **We are saving animals from extinction**. I see impactful education programs and events reaching new, young, and diverse audiences. We are **engaging and inspiring a new generation of conservation minded citizens**. **And just in time**."

In these opening lines Ashe emphasized three core arenas of aquarium and zoo activities that I experienced as central to their expressed identities during much of my fieldwork. Ashe highlighted "*outstanding animal care*" and the role of zoological organizations as "*animal advocates*." He pointed to financial investments—specifically in "*field conservation*"—and introduced the idea of AZA zoos and aquariums as "*global conservation leaders*." He praised educational programming that is invested in "*engaging*

and inspiring a new generation of conservation minded citizens." Ashe also emphasized that all of these activities are occurring "*just in time*;" a reference to ongoing species/habitat declines and future environmental challenges. Through his emphasis on these activities, Ashe—in his role as chief executive—was setting the tone and imbued expectations that the future of zoological institutions and their legitimacy is predominated on these activities. All of these spotlighted activity categories are intersected by a prioritized 'conservation-ethic'.

Significantly, Ashe did not describe zoos and aquariums as organizations that are just increasingly investing and participating in conservation activities. But rather, this introduction unabashedly foregrounded an institutional identity category that wholly focuses on tightly interweaving zoological institutions within the wider field of conservation action. Ashe resolutely claimed that zoological institutions are "*conservation organizations*", they are "*global conservation leaders*", and they are "*saving animals from extinction*." Notably, when I initially made the effort to attend the AZA conference as part of my field research, I was expecting to need to attend particular sessions explicitly related to conversation activities in order to access zoo-conservation discussions. Yet, there I was sitting in the very first general session 'welcome' event while the head of the AZA proclaims its members as 'global conservation leaders'.

Ashe went on to reinforce the status of AZA accredited institutions as "*innovators*" in the zoological field who are engaged in working towards a transformative future for zoological organizations:

> "…We are **innovators transforming what it means to be a modern aquarium and zoo**. We **are not satisfied with the comfort of our status quo**. We are here because we want to learn and grow and meeting the professionals who can inspire

us and connect us to something that is bigger and better. And that is why are proud to say that we are AZA. <applause>"

Ashe's messaging here should be understood through the lens of the historical position of zoological institutions as public animal exhibitors. The language of "*transformation*" and "*growth*" is the language of identity change, with particular emphasis on drawing a line around AZA accredited institutions as 'leaders' in that transformative process. The transformative acts that correspond to moving beyond the "*status quo*" and connecting to "*something that is bigger and better*" are direct linkages to conservation action and leaning into conservation-as-identity. The imagery of preservation and protection of species under threat of extinction is held up as the beacon of this transformation. This language of change is a rhetorical effort to imbue the "*meaning*" of "*modern aquarium(s) and zoo(s)"* with a sense of inevitability in their relationship to habitats and species, and activities to conserve them.

Figure 2.1 *AZA Conference attendees gathered during a 'general session' event. Image taken by author.*

"Redefining the roles of zoos and aquariums beyond the boundaries of our parks"

In this same morning's welcoming talk, Dan Ashe introduced the Chairman of the Board of Directors, Jim Breheny. Breheny is the Executive Vice President and General Director of Zoos and Aquariums for the Wildlife Conservation Society (WCS). This position makes him responsible for the operation of the Bronx Zoo, the New York Aquarium, the Central Park, Prospect Park, and Queens Zoos. As another member of the executive leadership of AZA, Breheny—who can be seen on Animal Planet's TV show, *The Zoo*—also took up the task of tone-setting and foregrounding conservation messaging. It is important to note that Breheny is very publicly visible in the zoo-community. Additionally, the WCS is held up by many in the zoological field as a model for zoos and aquariums seeking to undertake a transition in mission towards increased participation in field conservation. During his time on stage, Breheny chose to emphasize the following:

> "We worked really hard to expand the scope of our mission. **Beyond caring for and providing the best welfare for animals**…beyond providing an enjoyable family exhibit experience for people in our communities [sic]…to **redefining the roles of zoos and aquariums beyond the boundaries of our parks**. We are now **actively dedicating** our broad and specialized knowledge and skills **to the conservation of species in the wild.** Today, we not only pledge to provide the best care and welfare of the individual animals that we have in our zoos and aquariums and work to sustain the diversity of species that we attain through our management programs…we are also **openly committed to the conservation of species in the wild**. And that commitment has yielded incredible results. Dan mentioned it, **but I don't think we talk about it enough**. Five years ago we were putting 156 million dollars in to field conservation. This year we topped 220 million. That's amazing. 1 billion dollars to the conservation of species in the wild every five years. **That is something to be really proud of, and there's nobody else doing it.** <audience applause>

Breheny reinforced some of what we heard earlier from Ashe, which is the message that zoos and aquariums are now more than "*enjoyable family exhibits for…communities*", and that their organizational missions and "*roles*" now extend "*beyond the boundaries of*

our parks" to the "*conservation of species in the wild.*" This distinction between the conservation of species in captivity versus 'species in the wild' is an additional feature of their institutional identity transformation. This perspective is related to zoological organizations efforts to move beyond the 'ark model' that prioritized captive population assurance and into the realm of "field conservation"; both rhetorically and materially. Breheny also emphasized another element in his follow up to Ashe. He prioritized a message of exceptionalism. When discussing the financial commitments of zoological institutions to 'conservation of species of species in the wild' he explicitly framed those activities as being on a scale so exceptional that "*nobody else is doing it.*" This language of exceptionalism seemed to resonate with the audience of AZA members, as they interrupted his statement with an outbreak of applause. As I described earlier in this chapter, zoo folks (particularly those that fall into typical zoo-roles: keepers, educators, curators) are acutely aware of critical public opinions of zoos and aquariums' practices of captive animal exhibition. Perhaps, this sensitivity to criticism that is linked to the ethical haziness of their historical identities as animal exhibitors, primes them to readily embrace the image of themselves—being shaped by Ashe and Breheny—as 'advocates' and 'conservationists'.

"And for the doubters…"

As if to reinforce this, Jim Breheny immediately pivoted to directly address ideas about public perceptions—and criticisms—of zoo and aquarium activities. While themes of tensions between conservation professionals and the activities, identities, and public perceptions of zoological institutions were present across so many of my interviews and conversations, I found it particularly interesting to experience the Chair of the Board of

Directors for the world's largest accrediting body of zoological institutions address these themes in front of thousands of its members. Breheny said,

> **"And for the doubters**, for those that would be **skeptical**…*this* [original emphasis] defines our **expanded mission and commitment**. And *this* [original emphasis] is what will continue to make us **relevant in the minds of people, and in the minds of the public**.

The "*this*" that Breheny invokes in refutation of "*skeptics*" in the wider public, is the transformative conservation identity of zoos and aquariums. If I were to insert 'conservation' in place of 'this' it would read, "[conservation] *defines our expanded mission and commitment*" and "[conservation] *will continue to make us relevant in the minds of people, and the minds of the public*."

As noted above, in addition to being the Chair of the Board of Directors for AZA, Breheny is also a long time executive with the Bronx Zoo and Wildlife Conservation Society. In this capacity, he appears on the Animal Planet Television show, The Zoo. During his talk he had this to say about how he views the TV show, its messaging, and its role in representing zoological institutions to the public,

> *"*We did the show **to answer critics**, to **address the concerns of changing public attitudes**…*The Zoo* shows viewers that **we are not exploiters of animals**. But **caregivers and nurturers**. They see us provide intensive care for individual animals, but they also see examples of us working together to sustain species. **And they see,** perhaps for the first time**, the link between what we do in our zoos and aquariums and the** conservation work we do in the wild. Ensuring the survival of species in nature…We have **taken back the conversation on zoos and aquariums**. We are putting our own stories out there and working really hard to **produce a show that represents all of us in the best possible light**. People, our viewers, were largely unware of the work that we do together, that fact that we share common goals, that we are all friends, that we are collogues **supporting common efforts for our species in the parks, and in the wild.** And that zoos and aquariums **may be the best, and perhaps the *last*** [original emphasis] **best hope for many species' survival into the future**. This **not only makes us relevant**, it gives people hope. **We have the power to give people hope**…without hope, people give up. They won't even try. That is why out collective message, it can't be one of doom and gloom, it has to be one of hope. We need to inspire people…**to join**

with us in our mission to save species and protect what remains of the world's biodiversity."

Breheny described the TV show as an opportunity to "*answer critics*" and to address "*changing public attitudes*"—a direct reference to zoological institutional understanding that public opinion of traditional zoos is on the decline—by showing viewers that zoos and aquariums are "*not exploiters of animals*." Instead, he described how these organizations, and the people who comprise them, should be understood by the public as "*caregivers and nurturers*" of animals. He also continually reinforced the link between the activities that occur on zoo campuses and "*species in the wild"* and then going further by establishing that zoos and aquariums may even be the "*last best hope for many species' survival in the future*."

This is the narrative communicated by the most senior and influential members of the "zoo community" in North America about how the "community" should think of themselves. The message is that these professionals are "*animal advocates*" who are engaged in educating new generations of "*conservation minded citizens*." They are also "*global conservation leaders*" who are "*saving animals from extinction*" at levels beyond others working in conservation arenas and ultimately they may be "*the last best hope for many species' survival into the future*."

"We are stronger together"

The third day of the general conference, Wednesday September 26th, began with another two hour general session meeting in the main convention center ballroom, once again all flashing lights and music. President and CEO Dan Ashe took the stage to give his morning welcome. Ashe chose to reiterate the messaging from the previous day by saying,

> "…**we are stronger together**, we are AZA, and collectively in 2017 we invested more than 220 million dollars in field conservation. That puts *you* [original emphasis] among the largest conservation investors in the *world* [original emphasis]. Give yourselves a round of applause! <outbreak of applause from attendees>."

Ashe went on to reemphasize the role of AZA initiatives in facilitating its zoo and aquarium members participation in conservation activities as the penultimate priority within the zoo/aquarium identity transformation. "We are going to have more members…supporting more conservation. And that depends upon *you* [original emphasis]. Because **your collective effort** is going to **save animals from extinction**!"

"They say all the right words.."

The Association of Zoos and Aquariums, which accredits over 230 institutions in North America, reports that their members 'fund over 2500 conservation projects in over 100 countries and spend an average of $160 million annually on conservation initiatives' (aza.org), with the 2017 figures cited by Ashe and Breheny topping $220 million. Importantly, a consistent theme of how these numbers are calculated and communicated is by looking at them as an institutional aggregate and through the lens of the AZA. Noting that Ashe and Breheny leveraged messaging about "*our collective efforts*" and being "*stronger together*" as "*global conservation leaders*"; speaking about AZA accredited institutions as an aggregated entity. Yet, when analyzed from the perspective of *individual* Zoos and Aquariums, as autonomous institutions with multi-million dollar budgets, the vast majority of AZA accredited institutions dedicate less than 3% of their annual budgets to conservation initiatives; with many dedicating less than 1%. This is so much the case, that the World Association of Zoos and Aquariums (WAZA) recently called for zoological institutions to move towards allocating a minimum of 3% of their annual budgets to

conservation; a figure that is far beyond the current levels of most institutions (Minteer et.al. 2018). Additionally, specifically within those figures cited by Ashe and Breheny, it is important to acknowledge the impact of a small number of large and resource rich institutions, that commit the majority of these aggregated figures (e.g. Smithsonian/National Zoo, San Diego Zoo, Disney, WCS group).

With these financial realities in plain view for institutional insiders, many zoo-adjacent conservation professionals with whom I spoke during my field research expressed persistent skepticism about identity language that applies to an aggregate of North American institutions as 'conservation organizations' and 'global conservation leaders', being subsequently applied to the individual institutions in which they worked. In most cases, the budgets of these institutions allocate 97-99% (or more) of their annual budgets to activities *other* than conservation initiatives, and yet their executives are publicly foregrounding the 'conservation organization' messaging provided by the AZA. In a number of conversations, zoo-adjacent professionals described to me how they observe zoo/aquarium executives "*say[ing] all the right things and using all of the right words about supporting conservation*" both to zoo-staff and to the wider public. Yet, these professionals remain skeptical of "*market-spin*" and "*greenwashing*" that are done in order to leverage the lay-publics' positive associations with conservation activities (as seen in the AZA study cited earlier in this chapter), in order to deflect public criticisms while continuing to commit the overwhelming majority of institutional resources to *non*-conservation activities.

It *is* true, that zoological institutions have increased their financial and practical support for conservation initiatives—potentially in efforts to truly *"redefine the roles of*

zoos and aquariums beyond the boundaries of our parks," to quote Jim Breheny. Thus with that 'redefinition' comes the efforts by organization executives to transform zoological institutional identities into 'conservation organizations' who are "*saving species from extinction*." Yet, this messaging remains internally contested by groups of professionals who are skeptical of the motivations of executives and who are critical of the material implications of foregrounding conservation messaging and identity, ahead of truly widespread transformations of *practices*. As such, these conservation professionals communicated to me how in the face ongoing ecological challenges, it is important for them to simultaneously recognize the very real potential for diverse conservation support and participation that is present within zoological institutional capacity, but also to critically sift through the often over-represented conservation messaging (i.e. greenwashing) in order to see the material realities of institutional commitments and persist in pushing them towards greater conservation investments in the real-world.

IUCN 2nd International Reintroduction Conference
(Chicago, Illinois: Nov 2018)

In November of 2018 I traveled once again from Georgia—where I had been staying between field sites—to Chicago, Illinois for the International Union for the Conservation of Nature's 2nd International Wildlife Reintroduction Conference. The conference was held on the campus of the Lincoln Park Zoo (LPZ) in downtown Chicago and was attended by approximately 250 international attendees. In a press release earlier in 2018, Dr. Megan Ross of the LPZ described the upcoming event by saying,

> "…this is a challenging time for many species" and that "[LPZ] is excited to gather the greatest minds in reintroduction science to discuss how we can best increase our impact to preserve the natural world."

Also quoted in that press release, Dr. Phil Seddon—Chair of the conference's Scientific Advisory Group and Professor of Zoology at New Zealand's University of Otago—described his view that,

> "…the health of the natural world depends on us, as much as we depend on it…by developing the science and practice of reintroduction biology we can restore lost species and the ecosystems in which they live."

Unlike larger conferences, this relatively small event had no breakout sessions. The entire body of attendees were present for all presentations, panels, and keynote events. Organized around nine themed sessions, 50 speakers came together to "[share] *information, triumphs and tribulations from experiences restoring wildlife back into the wild*" (IUCN Reintroduction Conference Program 2018).

The Reintroduction Conference was—in part—organized, financially supported, and hosted by zoological institutions. Yet while the zoo presence was significant (due to zoological institution's roles in reintroductions/translocations), unlike the AZA conference in Seattle this event coalesced around a particular body of conservation philosophy and practice (conservation translocations); *not* an institutional typology. As such, there was a greater diversity of conservation actors and professionals that ranged from state and federal employees (U.S. and international), university researchers, environmental non-profit workers, zoo-adjacent conservationists, and more typical zoo employees. Conference themes ranged from decision making amidst uncertainty and technical practices, to 'broader contexts of reintroduction' and 'future opportunities and actions'.

Figure 2.2 *Lincoln Park Zoo Entrance Sign. Display message reads: "For Wildlife. For All." Image taken by author.*

Reintroductions and translocations as a body of conservation practice has an established history[18], but it is one that has become more prevalent over the last few decades and is arguably one of the more directly 'interventionist' practices within the broad array of activities that coalesce under the 'conservation' moniker. In an effort to access contemporary conservation activities and actors that are engaged in responding to contemporary environmental changes, organizations and individuals involved in reintroductions stand out as particularly informative. While all conservation is about intervention and management, particularly when viewed from the position of social scientific analysis, reintroductions—even amongst conservation actors—are considered more 'hands on' and interventionist in quality.

[18] See: North American Bison (~early 1900's), California Condor Program (~1980's), Yellowstone Grey Wolf Program (~1990's)

"The current mass extinction threatens to undermine the ecological fabric of nature."

Organized by the International Union for the Conservation of Nature's (IUCN) Species Survival Commission (SSC) Reintroduction Specialist Group[19] (RSG) this meeting was only the 2nd time the Group had organized a conference; with the inaugural international meeting held in Chicago a decade earlier in 2008. In establishing context for the existence of their specialist group and advocating for greater mobilization of this body of conservation practice, the group states that, "*day after day, an increasing number of species are becoming rare or even extinct in the wild*." This foregrounding of species loss and biodiversity declines is an established feature of rhetoric(s) that advocate for diverse forms of conservation activities. However, going beyond the more established language of species declines and local extirpations, the IUCN specialist group recently updated some of the descriptive mission-oriented language on their public medias.[20] According to their public positions, "*the* ***current mass extinction*** *threatens to undermine the ecological fabric of nature…*". This invocation of a present and happening mass extinction event is a very recent shift in language usage about the current 'ecological crisis'; not only by this specific specialist group, but by established and prominent environmental organizations. The *possibility* of a "mass extinction" event is something that has been studied, discussed, and contested by researchers, scholars, and organizations in recent years (Ceballos et.al. 2020). With circulating discussions about whether such an event was looming, just beginning, or already happening around us. The fact that an organization like the IUCN—

[19] The IUCN SSC Reintroduction Specialist Group has since been renamed. The announcement was made during the 2018 2nd Reintroduction Conference in Chicago.

[20] This updated language occurred after I attended the conference in 2018, and came about as part of the renaming process.

the only environmental organization affiliated with the United Nations General Assembly— has moved away from such contestation and uncertainty and into a clear position, is a marked shift in perspective. It is an important transition in environmental rhetoric about how global environmental organizations, like the IUCN—which is comprised of over 1400 member organizations—understands contemporary environmental challenges. This shift in positionality, on the part of an IUCN specialist group, in their relationship to the reality of a sixth mass extinction should be viewed in its broader environmental political context. Beyond just the SSC's Conservation Translocation Specialist Group's now public facing consensus on the matter of an ongoing mass extinction, their position must be assessed through the lens of their influence. The IUCN and its affiliated groups are considered international 'scientific subject matter experts', and the language and environmental perspectives that comes out of these bodies should be understood to have cascading influence that radiates from this powerful environmental organization.

With these features foregrounded, 2018's 2nd International Reintroduction Conference in Chicago was an opportunity to experience the perspectives and view-points expressed by a coalescent group of conservation actors; those that operate in zoo-adjacent spaces as well as those who do not. Both the formal presentations/panels and the ongoing casual conversations at this meeting presented an occasion to steep in a breadth of topical engagement around this body of practices that is a rare convergence. Additionally, this was an opportunity to experience how these professionals present their ideas, how they speak to each other, how they interact, and how they speak about their understandings of their own positionalities to the environment and that of conservation activities more broadly. As

an anthropologist who studies environmental conservation philosophies, practices, and politics, the ethnographic experience of observing and participating in this event was equivalent to seeing those studied conservation discourses come to life.

"You probably have more in common with the person sitting next to you then you might with a neighbor back in your home country."

The conference was opened by Dr. Axel Moehrenschlager, who is the current Chair of the IUCN Conservation Translocation Specialist Group and the Director of Conservation and Science at the Calgary Zoo in Alberta, Canada. In his opening remarks, Dr. Moehrenschlager outlined the work that went into organizing the conference and why it was a uniquely special event. Moehrenschlager remarked how something that "*struck*" him when thinking about all of the attendees from countries "*around the globe*" was how, in his view:

> "…you probably have more in common with the person sitting next to you then you might with a neighbor back in your home country." Why is that? It's because you love Nature. It's because you value science. And it's because you have a desire to make a difference for species, for ecosystems, and the benefits that come along with that for humanity."

Moehrenschlager was establishing a sense of connection and 'community'—the favored term used by conservationists—amongst the listening the audience. He was foregrounding connections that occur across national and cultural lines, with the idea that a coalescence forms around '*love of nature'*, '*valuing science'*, and a desire to "*make a difference*" for species and ecosystems. This sort of coming together in a 'community' of like-minds with like-ethics and morals is an ongoing trope. Importantly, while this was a public statement, it was not a statement made to an un-indoctrinated public audience. This is another example of how some conservation actors see themselves, see their relationships

to each other, and how they see their collective relationship to the bio-physical environment, or nature.

Moehrenschlager went on to highlight the "*responsibility*" that corresponds, in his view, with the "*privilege"* of education and "*knowledge"* of the environment:

> "If you think about the world…we are just so privileged to have an education. And that education gives us knowledge…and that knowledge comes with a **responsibility**. A responsibility to apply that knowledge **for good**. And it doesn't matter whether you're an undergraduate, a professor, a zoo keeper, or a parks manager. You all have the ability to make a **tremendous difference to help save species**…But, in this room you have the current and the future leaders for reintroductions and other conservation translocations. Here in this room lies the future partnerships and collaborations that will make it possible for you to make an even bigger difference in the world than you could possibly do all by yourself."

Moehrenschlager was doing two things here: first, he was establishing the perspective that he and those in the room belong to a certain kind of privileged class, secondary to their access to (scientific) education and knowledge (of the environment). Establishing that possessing such knowledge of the environment comes with a tandem ethical "*responsibility*" to act towards a larger "*good*"; with 'good' being an implication of conservation actions. Second, he is reinforcing another trope of contemporary conservationists, that 'good' and 'successful' conservation activities only come through partnership and collaboration[21]; further reinforcing the collectivist community perspective.

> "Reintroductions are increasing exponentially all over the world. Whether you think about coral in the ocean or elephants in Africa or India, the use of tools developed are being applied in more places, for more species, more of the time. Science has yielded evidence and evidence has yielded action. Reintroductions and other conservation translocation, as we know, have already **saved many species from extinction**. But what you do is frankly even deeper and more profound than that…because, when you try, and often succeed, in the things that you are doing, you are yielding something that is even more powerful. It is something that we all need, especially now, all over the world even more than ever, and that is hope. It is

[21] See: Chapter Five of this dissertation

> hope that we can repair the mistakes of the past and that we can take on the challenges of the future."

Here again, we see the ongoing theme of conservation actors drive to "*save species from extinction*," but also, Moehrenschlager emphasized his understanding of the profundity of such responsibility to the environment. He reinforced something I heard from Jim Breheny of the Bronx Zoo at the AZA annual meetings a few months earlier; a belief that conservation efforts, and conservationists themselves, are involved in creating "*hope*" within the broader publics. In Breheny's view, 'hope' was an affective connection to nature that could lead people to behave in ways that were in line with a conservation-ethic. While for Moehrenschlager, it is the manifestation of a "*powerful*" "*need*" to believe that conservationists might "*repair the mistakes of the past*" that have resulted in the loss of species, and that conservationists are prepared and able to attend to future environmental challenges. Moehrenschlager closed his welcome by saying,

> "[Over the next few days to you will hear about] challenges, innovation, setbacks, and successes…in order to learn together…[and] support each other as a community. More than ever **the planet needs our help**. Here we have the desire, we have the ability, we have the knowledge to make a difference. So let us learn together…and let us act together now for this planet, for nature, and for the future generations to come. Thank you. <audience applause>

In the closing of his welcome, Moehrenschlager sets the tone for what he sees as the priorities for this coming together of like-minds; prioritizing the exchange of experience and the bolstering of a community dynamic. This conservation community coalescence, for Moehrenschlager, happens around the desire, ability, and knowledge to "*make a difference*" because the "*planet needs our help*." And it is the "*responsibility*" of the conservation community to "*act together for the planet…for nature…and future generations*."

"Novel Ecologies…Our Future Nature"

Following his welcome, Moehrenschlager introduced Dr. Mark Stanley-Price to give the first plenary-event talk of the meeting. In the world of conservation, Stanley-Price is a well-known and respected figure, whose remarks carry the kind of weight attributed to senior scholars in a field. Dr. Stanley-Price has worked in conservation for more than 30 years; he spent 12 years in the 80's and 90's as Director of African Operations for African Wildlife Foundation, seven years with Durrell Wildlife Conservation Trust as CEO—whose mission is "saving species from extinction"—and most recently he has worked with the research unit WildCRU at Oxford University. Additionally, Stanley-Price has Chaired and served on numerous IUCN committees and was the founder and Chair of the IUCN's Reintroduction Specialist Group, beginning in 1988.

All of this to say, Stanley-Price's resume represents a very 'classic' image of a conservation practitioner, which makes his experience an interesting window into the field of conservation over the last three and half decades, and into its future. Stanley-Price stood up at the podium with his fly-away grey hair, calm demeanor, and speaking with a soft English accent. Addressing "*Our Future Nature*", he had this to say:

> "I would submit that reintroduction and translocation have arrived as a mainstream conservation intervention, and the two terms are now largely interchangeable. And today's translocation efforts are occurring in the context of much greater appreciation of the **catastrophic declines in biodiversity** that we are seeing…and this should be a guiding concern for how we look to the future."

Stanley-Price was laying out what he understands to be the accepted context for his discussion. Referencing the first Reintroduction conference in 2008 (and his own career in the field), he was acknowledging that there has been a growth in understanding about environmental change, and in his view, there exists a "*much greater*" recognition of the

clear and present "*catastrophe*" of ongoing biodiversity declines. Once more, leaving behind the cautious discourse about 'possible' extinctions for a more established and absolutist view. In function, the repositioning of reintroduction and translocation interventions as part of "*mainstream intervention*" is directly linked to this appreciation for "*catastrophic declines*." The more catastrophic the contemporary changes, the more necessary interventionist strategies become for the future, in this view.

He continued by describing his experiences with re-introducing the Arabian Oryx to Oman in the 1980's, discussing the decision making and challenges of that project. He also laid a subtle critique of "*traditional ecosystem theory*" that described a kind of mechanical complexity, while ignoring a more flexible "*ecosystem reality*." He also described how early reintroduction interventions often focused on "*large and conspicuous*" species that were understood to have been extirpated secondary to "*persecution*," not habitat loss. He additionally commented on the shifting "*motivations*" of the field, from focus on restoring conspicuous species to filling niches and restoring ecological function (e.g. Gray Wolves of Yellowstone NP).

> "Now let's move on to the question of whether reintroduction will play a constructive role in our future nature. If you take [that] the fundamental aim of reintroduction translocations is to create or restore niche viability…[this] might be an increasingly tricky position. Let me explain…<explains how according to current guidelines "responsible" reintroductions should only take place within an 'indigenous range' of the species> **So while we are not looking to some artificially chosen historical reference state, we are basically looking backwards in time for justification. And is there not a strong influence of nostalgia in our desire to recreate the past?**"

This series of statements might seem unsurprising to those who have studied conservation from a critical perspective, however, this kind of thinking—particularly from an esteemed practitioner—is arguably a surprising thing. While Stanley-Price recognized

that most contemporary conservation interventions have moved away from aiming to restore an "*artificially chosen historical reference state*," and have moved instead towards restorations of ecological "*niche viability*," he argued that these acts are still effectively "*looking backwards…for justification*." Stanley-Price named what he called a "*strong influence of nostalgia*" within conservation and conservationists in the "*desire to recreate the past*." For Stanley-Price, this nostalgia for a past nature is not only something that deserves to be reflected upon, but it is also going to become untenable or an "*increasingly tricky position*" to occupy and endeavor to enact on landscapes and ecologies. By way of explanation, he proceeded to describe how current predictive modeling suggests "*huge*" shifts in regional climates around the globe and described the potential for "*novel*" climates for which there are currently *no* models. He said, "*at the very least one would expect this to result in a shuffling of the components of biodiversity*." Further, the cascading effects of global climate change are not a future possibility, but rather:

> "Climate change is already a reality; forcing adjustments in species ranges and phenologies. We suggest that these **novel systems require significant revision of conservation** translocation and restoration norms and practices. **Away from the traditional placed based focus** on **existing** or **historical** assemblages."

Such a suggestion is potentially asking for not only a revision of decision-making, practices, and missions; but rather, a realignment of conservationists perception of—and relationship to—their ideas about nature. A shift in their "*responsibility*" to species and ecological systems away from prioritized foci on conserving what is already there or restoring '*what should have been*.' Because in the face of global climatic shifts and resulting novel ecosystems, the mechanisms by which conservationists assess "*historical assemblages*" of 'what should have been' are potentially no longer ecologically viable. Thusly, aspects of conservationists relationship(s) to the environment are equally unviable.

Stanley-Price went on to ask, "*Given this wisdom, should we not be more forward looking? And take a more predictive and anticipatory view rather than our prevailing one of reactive to population reductions or extinctions?*" Rhetorically inquiring if given what is understood about biodiversity declines, species extinctions, and a "*shuffling of the components of biodiversity*" alongside the manifestation of hybrid and novel ecologies, is it not incumbent upon those engaging in conservation activities to be less "*reactive*", less "*nostalgic*," and more future-minded?

Speaking directly to the captive-management activities of zoos, aquariums, and botanic gardens, Stanley-Price asked of the audience, [with the] "*status of the world's biodiversity on a downward trend. Are you going to allow these massive extinctions? If not, then what are the options?"* Speaking to an audience full of folks who work with or adjacent to zoological institutions, he said, "*zoos and botanic gardens cannot accommodate more than a fraction of the species that would need conservation support* [amidst climate change], *there is simply no room*." But even for those species that do claim space in captively managed populations, the absence of ecological 'selective-pressures' makes captive insurance a questionable long term strategy, in Stanley-Price's view.

While in some instances, he believes leaving species to "*fend for themselves*" and observing the "*extent to which species can adapt to changing conditions*" or "*disperse through their own mechanisms*" is a potential avenue for conservation actors, for Stanley-Price, the "*final option is to move species around*." While conservation reintroductions and translocations are by definition an intervention practice that "*moves species around*", in the context of a "*catastrophic*" decline in species and shifting ecologies, Stanley-Price points to, "*the so-called assisted migration or colonization approach";* moving species

"beyond their indigenous range." He described how the IUCN's 2013 guidelines "*are pretty hard on this option*" due to the risks of invasive potential, species hybridization, and the issue of matching climate suitability amidst climate change; he recognized that these "*concerns still certainly remain*." However, for him "*it is hard to see how many species will persist with present trends of conditions*" even with the use "*traditional"* reintroductions and translocations.

So, Stanley-Price asked, "*what must be done* [for translocations to contribute responsibly] *to 'our future nature'?... What is missing?*" Answering his own questions, he suggested the following:

> "I see a number of obvious areas. We have **to be prepared to change our attitudes on what is right and what is nature**. The natural world **may bear less and less resemblance to what we regard as wild**. In this light…I venture that reintroduction, putting species back to restore…is a form of nostalgia for the familiar and the recent past….I argue as conservationists we have to be not less nostalgic, but look more to the future."

For Stanley-Price, the act of looking more towards the future and less towards a nostalgic past must correspond with a reconfiguration of "*what is right*", redefining how conservationists view "*what is nature*" and what they "*regard as wild*." Because, for Stanley-Price, those philosophical perspectives that prioritize a '*restoration of the past'* must shift alongside a shifting bio-physical reality. This includes an investment in anticipatory thinking, experimental approaches, as well as re)addressing beliefs about "invasive/alien" species, and the increased use of "proxy" species.

> "Now in conclusion, some of my thinking may be **extreme provocation** or even **heresy**. But I put it forward based on the **state of ecological change we are seeing**.
>
> To help us, we should remember the words of Max Plank: 'A new scientific truth does not [become so by trying] to convince its opponents…to see the light. But rather [it becomes so] because it opponents have actually died and a new generation

> rose up. Which is usually paraphrased by 'science advances but one funeral at a time.' <audience chuckle>

In those final closing remarks, Stanley-Price—with good humor—acknowledged that his position may provoke a strong response in the listening audience of conservation professionals. Prior his own talk, the audience had been encouraged by Axel Moehrenschlager to come together as a "*community*" and coalesce around a shared "*love of nature*" in order to "*repair the mistakes of the past*." Yet, Stanley-Price is suggesting something quite different. He is still suggesting a coming together of devoted practitioners to intervene in species extinctions, but with a mind towards the future. A future that in his mind, "*may bear* less *resemblance*" to the past. As such, conservation actors will need to let go of their "*nostalgia*" and desire to "*recreate the past*" in favor of a potentially hybrid and/or novel socio-ecological assemblage in a presently unknown future. Stanley-Price's use of the word "*heresy*" to describe his positions is telling; with heresy being defined as 'an opinion or belief contrary to orthodoxy.' Here, "traditional" understandings about ecologies, indigenous species and ranges, and ideas about what *is* "wild" and what *counts* as "nature" are part of an established conservation orthodoxy; and it is this ardent grasping for a past nature that, in Stanley-Price's view, must change.

"Novel ecosystems [would mean the] death of marsupials in Australia"

As evidence to the correctness of Stanley-Price's anticipation, the latter few minutes of his talk were punctuated by alternating silences (of a quality that insinuated rapt attention) and quietly exchanged mutterings between neighbors. During the coffee break that followed Stanley-Price's talk I fell into conversation with two Australian conservationists whom I had met and spoken with the night before at a conference social

event. Callum[22], a vertebrate population ecologist in his early 50's who has worked on projects to restore Australia's island ecosystems for decades, had critical questions about the practical differences between "rewilding"—a term used predominantly in the UK and Europe—and "restoration." Concluding that perhaps rewilding is functionally the same as restoration, but without the reliance on an historical reference point. Malcolm[23], another Aussie who previously worked on small carnivore reintroductions in the UK but has more recently returned to work in Australia, was more riled. For him, the idea of 'novel ecosystems' felt like "*giving up*" on the work being done in places like Australia; where they have spent years trying eradicate human-introduced species like the Red Fox, feral domestic goats, and feral domestic cats that predate upon and outcompete endemic/native wildlife. From Malcolm's position, if "*novel ecosystems are accepted*" that would mean the "*death of marsupials in Australia*." While the precise 'temperature' of the room following the talk was difficult to measure, it *was* clear that Stanley-Price had most definitely generated a mixed response; prompting intellectual discourse from some and emotional reactions from others.

Over the next couple of days, presenters covered a range of topics from program development, to decision making strategies, to sharing stories of success, failures, and challenges, and offering critiques: Some other conversations and commentary that stood out included recognition that "*we often hear reintroductions being criticized*" owing to the fact that the vast majority of attempted reintroductions fail. But, according to one conservationist working to reestablish a species of toad in Italy, "*10% of the time we fix*

[22] Pseudonym
[23] Pseudonym

things…and I think that is great." Kevin Parker, from Parker Conservation in New Zealand, pushed back on what he called an "*obsession with pre-human contact reference ecosystems*" and argued for a conservation ethic and practice that was "*informed by, but not bound to what once might have been there*."

On Thursday of the conference, well known ecologist Professor Richard Hobbs—who had been heavily cited throughout the meeting's presentations—spoke about restoration ecology and reintroductions. Hobbs spoke about his 2018 publication 'Movers and Stayers', that described how going forward into the future,

> "…some stayers may, in the absence of intervention, ultimately undergo extinction [15]. Species assemblages under environmental change thus comprise mixes of stayers (some of which are doomed to eventual extinction and some which will persist) and movers, which invade and expand at different rates."

This view reinforces some of the positions expressed by Dr. Stanley-Price on the opening day of the conference. Hobbs went on to describe his position that conservation is rooted in conservationists' desire to "*repair the damage we have done to the world*" and how conservation practitioners are guilty of, "*always looking back to the good ol' days…whatever they were*." Hobbs asked the audience of conservationists to reflect on whether 'restoration' is a *"worthwhile goal when we know these habitats are changing anyway*?" and emphasized that the importance of asking themselves, "*is it really worth it* [given the challenges]*…or should it* (certain species) *be allowed to go extinct* [in some instances]*?"*

Hobbs' presentation was followed by Sarah Dalrymple from Liverpool University who, as part of her larger presentation on the role of "niche assessment" in conservation planning, stated that "*we cannot save everything…so functionally significant species should be prioritized over those that are equally rare but are functionally redundant*."

Other presenters spoke to challenges of financing conservation programs, saying "*funding for conservation is finite and we need to think about the big, broader picture*"…and "*action should not be taken if there is no [direct] benefit*" to the specific population or environment, because "*we can't do it all*."

"Do people even think of us?"

On the final day of the conference, the attendees once more heard from the Chair of the Reintroduction Specialist Group Axel Moehrenschlager. His final address was about "*Future Opportunities*" for conservation and reintroductions. He covered a range of topics, including notable "*failures*". The latter included an emotional apology to the Northern White Rhino species, "*I'm sorry. I am sorry that we failed you*[24]." Moehrenschlager then pivoted to address reflections about the wider role of the Reintroduction Specialist Group, within the field of conservation, following the creation of the 2013 IUCN Reintroduction Guidelines. Expanding on those reflections, Moehrenschlager made the following announcement on the 30th anniversary of the Reintroduction Specialist Group:

> "I have literally been thinking about this reflection for four years now. Is the [reintroduction] mandate the right one?... **Do people even think of us in a broader space** [of conservation practice]? We would like for them to think of us in a broader space, but they don't. And I think we are missing from the table. And so, I am going to do something that feels sacrilegious, almost. But, I am going to do it anyway. This second, is the **end of the name of the Reintroduction Specialist Group** and from this point forward we will be the **Conservation Translocation Specialist Group**."

With that statement—and the unveiling of the new logo on the projector screen behind him—Moehrenschlager marked a transition from the past 30 years of the specialist group's identity and mission. For him, and for the committee that currently steers that

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24 This was related to the widely publicized death of 'Sudan', the last living male Northern White Rhino earlier that year, at the Ol Pejeta Conservancy in Kenya. In a room of professionals who specialize in preventing extinctions, the loss of Sudan was an emotional event for many.

group's priorities, there is a sense that the Specialist Group is not being included at "the table." With the 'table' being a metaphor for broader participation in the development of conservation interventions. This decision to make a name change—while the movement from 'reintroduction' to 'conservation translocation' may not be immediately impactful to outside observers—can be understood to be directly linked to multiple driving factors. First, as Moehrenschlager stated, it is about working to change the way the group is perceived by outsiders in order to facilitate greater participation with other conservation actors. Second, it is about a desire for an expanded mission in the context of accelerating challenges to addressing issues of conservation concern,

> "…we will not stand…for letting anything down on our watch. We…in this community…deal with a powerful conservation tool…and we will do science-based activities to help species all over the world. Through different ways of moving around…to help species…to take care of beasts that are big and the ones that are small. For their own sake and for their functions' sake. And so with that, I just invite you to our new beginning, to our bright tomorrow, our journey forward together. The world needs us, we have a powerful tool, let's just keep going. Make a difference now, make a difference in the future, together."

In the face of ecological unknowns, this name change is both a reactive and proactive marker. Marking an identity evolution in the face of futures currently unknown and a desire to participate more broadly in interventions on behalf of species and wider ecologies. These closing remarks also reinforce much of the language and perspectives about the broader roles of conservation and conservation practitioners, as expressed by said practitioners. Moehrenschlager states how "*we will not stand for letting anything down on our watch*." Once more invoking the "*community*" to "*help species all over the world*" and "*take care of beasts that are big and ones that are small*." Both for their own good and for the [functional] good of broader ecologies. Because "*the world needs us*" to "*make a difference*" together.

Conservation Transformations

The Association of Zoos and Aquariums (AZA) national meetings and the IUCN's 2nd International Wildlife Reintroduction Conference served to highlight the ongoing transformations within conservation. Importantly, these professional events provided opportunities to hear (formally and informally) directly from executives, well-known figures in the field, and every day conservation professionals—working in less-often examined conservation activities—as they spoke to each other about addressing the issues of the current ecological moment and how they view conservation(ists') responsibilities and relationships to the challenges they present; and what philosophical and practical transformations conservation(ists) may need to undergo as a result.

In my preparations to attend the AZA conference in Seattle in 2018, I was initially anticipating having to dig deeply into 'conservation-specific' spaces in order to access zoo-conservation conversations within particular sessions or panels. Yet, from the very beginning of the national meeting, myself and thousands of zoo attendees were immediately greeted by a full force wave of conservation discourse coming from the Association's executives. Hired just a year prior—as a former Director of one of the U.S.' largest federal agencies dealing in the conservation arena—Dan Ashe, alongside Jim Breheny, brought his experience and reputation within the conservation field as he participated in crafting a explicit conservation identity for AZA accredited Zoos and Aquariums. Across multiple days and numerous events, the AZA executives (and guest speakers like Collin O'Mara from the National Wildlife Federation) continually reiterated the messaging that AZA Zoos and Aquariums are "conservation organizations" and they are "global conservation leaders" who are "saving species from extinction."

While it is true that AZA's 240+ accredited institutions support conservation related activities in over 100 countries and have been increasing that support domestically and internationally over the last decade, this effort to transform the identity of zoological institutions into one of 'conservation organizations' remains contested by many of the conservation professionals who work within them. As I have written about in this chapter and others (see Chapter Five), zoo-adjacent conservation professionals—biologists and ecologists whose training and primary experience lie outside of zoo-spaces—often communicated to me how they were attracted to working within zoological institutions precisely because they saw the potential within institutional capacities to address conservation issues (e.g. through breeding/reintroduction, public/community relations, research). However, these professionals are skeptical of this attempted public transformation of zoological institutional identities into 'conservation organizations', that are unreflective of the commitments and activities of most of these institutions at the individual level; in which the vast majority are committing far less than 3% of total budgets to conservation (Minteer and Collins 2018).

A central feature of this contention, are persistent questions from zoo-adjacent conservationists in regards to some of the underlying motivations they perceive to influence these attempts at institutional transformations. A significant element of which is related to the findings of the 2018 AZA report discussed previously, which showed that conservation is a powerful factor in shaping public attitudes about zoological institutions. Leaving many conservationists with whom I worked skeptical about precisely why AZA executives and individual institution executives/boards are quick to adopt language about themselves as 'conservation organizations' (citing investments and figures from an AZA

aggregate), while the vast majority are dedicating 97+% of their individual budgets elsewhere. Additionally, some conservationists question whether foregrounding conservation identities (before embracing expanded conservation participation) will allow zoos and aquariums to capitalize on positive public perceptions about conservation to shift public opinion, but leave the institutional decision makers able to continue prioritization of the core zoo activities of animal exhibition.

Ultimately my evidence shows that, it is true there has been increasing direct participation and financial support of conservation activities, by AZA zoological institutions in recent history. It is also true that zoos and aquariums are particularly well situated, due to existing institutional capacities, to participate in interventions directed towards accelerating contemporary conservation issues; related to species declines and ecological reconfigurations. However, while there is recognition of the significant role for zoological institutions to play in addressing these conservation issues, I share the skepticism that was communicated to me by zoo-adjacent conservation professionals in regards to institutional motivations to embrace the transformative identity as 'conservation organizations', *before* individual level resource commitments (human and financial) to expanded conservation participation. Thus, this evidence shows that the attempts to publicly transform zoological institutions into 'conservation organizations' must be viewed as simultaneously responding to ongoing ecological crises—and zoological institutions desires and abilities to participate in conservation interventions—as well as responding to declining public perceptions of zoo and aquariums by leveraging positive public opinions of conservation activities.

A dominant theme, present across the IUCN 2nd International Wildlife Reintroduction Conference in 2018, was that of conservation professionals grappling with the realities of ecological reconfigurations and transformations, and how those realities ultimately prompt transformations of conservation thinking and in their practical responses. Significant to any examination of how these particular professionals were reflecting on these ecological changes and potential conservation responses to them, is a recognition that these conservationists are engaged in a body of practices (reintroductions/translocations) that are often mobilized to intervene in species extirpations and potential extinctions. Beyond the conservation models that rely on identifying 'intact' habitats/ecologies and drawing 'protective' barriers around them, the professionals present at this conference were those who specialize in "moving species around." However, even though these professionals embrace a body of practices that are more 'interventionist' in quality, it was clear that many struggle with the idea that ecological futures under climate change will bear less and less resemblance to the past, and as such, a conservation philosophy and subsequent practices that seek to 'restore' a past nature are potentially inviable.

While there remains professional skepticism about the concept of 'novel ecologies' and resistance to the idea of needing to allow some species to go the way of extinction in order to prioritize others, I argue that ongoing species declines and ecological crises are going to prompt a greater infusion of reintroduction/translocation interventions into the 'mainstream' conservation landscape. Dr. Axel Moehrenschlager described how he felt that reintroduction/translocation specialists were "missing from the [mainstream conservation] table," and that their absence was untenable in the face of species-level and

ecological-level issues that could be addressed, in part, by 'moving species around.' As the world's ecologies are altered by climate change, landcover change, and other environmental pressures, we are going to see a precipitous increase in conservation activities that increasingly move beyond protected area preservationist norms, and into a space where conservationists are more readily willing to embrace the translocation of species in order to see them persist into unknown futures. Translocation specialists are hungry for a 'seat at the table' and as 'mainstream conservation' encounters the boundaries of its own viability amidst species declines and ecological alterations, I argue we are entering phase of contemporary conservation where it will be increasingly common to see species shifted by conservationists in all manner of contexts. These kinds of hands-on, closely interconnected, interventionist models—that interweave humans and non-human components of nature even more tightly together—are going to be an integral part of the conservation science landscape moving forward (see Chapter 3); and it is only through close attention to the wide array of conservation activities and by centering conservationists as ethnographic subjects, that anthropology will be positioned to examine these transformations and truly understand the contours of ongoing conservation actions into the uncertainty of "*our future nature*."

Chapter 3: Connections Through Conservation

Minteer and Collins (2012) describe how the implications of biodiversity declines, global climate change, and ecological (re)configurations are facilitating internal reassessments and interrogations of conservation values, goals, and ethics—some of which were explored in Chapter 2 of this dissertation—and there are increasing debates over the "proper ways" to conserve species amidst the challenges of uncertain ecological futures. Büscher and Fletcher (2020) also examine how the dominant underpinnings—the core ideas about what counts as Nature and how it should be protected and preserved into the future—that inform "mainstream conservation" decision making are being increasingly challenged by the contemporary features of the anthropocene.

While Minteer and Collins' (2012) work focuses on conservation philosophy, ethics, and practice, in so doing they also necessarily trace the evolution of conservation practice in relationship to environmental change. Their 2012 discussion describes how species declines and ecological change have, in some arenas, fostered transformations in conservation philosophies and related praxis towards increasingly "pragmatic" and "interventionist" models of action. Writing together again in 2013, they describe how the accelerating pace of global environmental change "is blurring the distinction between ex situ (zoo and aquarium-based) conservation and in situ (field-based) approaches as zoos and aquariums become more active in field conservation work and as researchers and managers consider more intensive interventions in wild populations and ecosystems to meet key conservation goals" (2013:1). In this chapter I address a specific case example of a body of practice that falls under the umbrella of increasingly "interventionist" models of

conservation practice *and* is an example of the 'blurring distinctions' between in-situ and ex-situ activities; captive breeding and reintroduction.

Ultimately, through this case study I argue that the diversity of socio-ecological activities that are subsumed under the monumental moniker of 'Conservation' are best contextualized and humanized when examined through the lens of the *people* who manifest them—through explicit attention to conservationists as ethnographic subjects (Kiik 2018). Environmental conservation activities that happen on-the-ground are shaped by the people who enact them in place, and are influenced—in part—by the relationships between those people and the species, habitats, and landscapes with which they are connected and committed.

Thusly, I am clear in my agreement with Minteer and Collins (2013) and Büscher and Fletcher (2020) in their assessments that the challenges of the current ecological crisis are facilitating a shift in conservation action(s) which increasingly foreground activities that are more "interventionist" in quality and outside of the parameters of the historically situated conservation "mainstream". However, in this chapter I refocus this conversation around 'interventionist technical solutions' beyond examinations of broad trends across the conservation field, in order to "personalize [and] humanize" (Kiik 2018) these activities through the stories, experiences, motivations, and connections of the people who are committed to them. In this chapter I argue that alongside recognitions of increasingly 'interventionist' conservation activities, anthropologists must also recognize how the qualities of these technical solutions (e.g. captive breeding and reintroduction) are producing more entangled and interconnected conservation relations. A contemporary conservation in which the professionals who shape these interventions on the ground are

engaged in activities which are more materially connected and relationally entangled with species and ecologies, than ever before.

While conducting my field research, and especially in centering examinations of conservationists' relations with species and ecologies, I often found myself thinking about these relational entanglements through the lens of anthropologist Julie Archambault's *Taking Love Seriously (*2016); in which the author examines the contours of human-plant relations present between ornamental gardeners and their plants in Mozambique. While I don't mobilize 'affective intimacies' like Archambault's exploration of *love*, I often found myself observing, participating, and asking questions that sought to 'take *connection* seriously' between conservation professionals and programs, and the components of non-human nature with which they were relating. Because, I argue, a significant absence in social science literature on conservation is a humanized understanding of the 'desire for connection' to nature that animates the *people* who *become* conservation(ists). As I discussed in Chapter 1, my understanding of conservationists as 'experts' prioritizes considerations of these professionals as *people* and social beings engaged in particular human-environment relations, *not* as "rationalist creatures of expertise" engaged in technical activities (Boyer 2008). As such, this chapter's examinations are the outcome of my taking seriously the manners of connection between conservationists as people and animals/habitats/ecologies (i.e. nature); which, this evidence shows, become undeniable when this body of activities are explored from within and alongside the individuals and groups who enact them. This research and analysis provides insight into the entangled relationality—the contours of connection—that are missing from so much of the literature on contemporary conservation.

This chapter illustrates those features of a more entangled contemporary conservation through an ethnographic examination of 'connection' between North America's largest species of non-venomous snake—the Eastern Indigo (*Drymarchon couperi*)—and the professionals committed to their long term conservation. Bringing into the light the material, technological, motivational, and representational connections that interweave individual professionals, organizations, and programs, with animals, regional habitats, and landscapes.

FIELDWORK AND METHODS: 'Working for' the Data

Not all conservation organizations or conservationists want to be the subject of study. In my fieldwork experience, the level of comfort with hosting a social science researcher ranges from curiously interested or cautiously open, to completed closed and unwilling. The data on which this chapter primarily draws were gathered during my time working *for* the Central Florida Zoo's Orianne Center for Indigo Conservation, in the winter and spring of 2019. I make the distinction between 'working for' and 'working on', with intention. I do this because the language of working *for* an organization is more accurate and descriptive in regards to creating an image of how I gained access to different organizations during my multi-sited fieldwork. It also provides a window into some of the practicalities for why my research model was necessarily multi-sited.

Importantly, in my experience, conducting ethnographic research in conservation organizational contexts requires that the researcher moves beyond some of the characteristics typical of participant observation. While there are opportunities for pure observation (e.g. meetings, events, presentations, etc.), research conducted *within* conservation organizations requires that the researcher emphasize the 'participatory'

aspects of our research toolkit. When spending all day with an organization's small staff, five to seven days a week, there is no practical reality for extended non-participatory opportunities. In my experience, if you want access to conservationists and the work they are doing, you need to be of use; you need to mobilize your own skillsets and get 'stuck-in' with the work they are doing. During my fieldwork this meant working as a volunteer member of staff for the different organizations that were willing allow me access to their day-to-day activities for weeks and months at a time.

This research structure was conceived through an admixture of practicality and through drawing on a combination of ideas and work from scholars like Karen Ho (2009), Piers Locke (2017), Monahan and Fisher (2015), Daniel Souleles (2018). Ho examined the "workaday activities" of investment banks and bankers from within financial institutions, Locke articulated the methodological advantage of "apprenticeship" in gaining access and embodied experience, while Monahan and Fisher describe the challenges of gaining access to effectively study "guarded organizations" and Souleles reflects on the process of "studying up" with people who may not want to be studied.

While more traditional non-zoological conservation organizations are not necessarily aware of social scientific criticisms of their activities, zoos and zoo-adjacent conservation organizations occupy a different position. They carry over a degree of constant awareness of potential public criticism that is rooted in the more typical activities of zoological institutions—namely, growing public unease with housing captive wildlife for viewing and entertainment. This has the effect of placing zoo-based activities and zoo-adjacent organizations within the "guarded organization" category; and while these organizations regularly bring in volunteers and interns from the outside, they still exert a

measure of caution in regards to social science research. This makes the logistics of gaining entre and continued access a challenge to conducting this kind of research.

As I grew to recognize these different challenges and potential barriers to conducting ethnographic research *on* conservation organizations, it was a necessary practicality to orient my research process to take place *within* these organizations. Leveraging my past professional skillsets, more so than my credentials as a researcher, facilitated my ability to work *within* these organizations. Rather than prioritize my status as a researcher, when contacting potential research sites I was very intentional about foregrounding my existing experience with environmental organizations, environmental education, animal medicine/behavior, and conservation activities. During email conversations with administrators, I would place emphasis on my willingness to be "put to work" in whatever capacity they felt would be useful. While these conversations were explicit about my research, offering to work *for* these institutions seemed to allow them to place me in a volunteer or intern "slot" that made sense within their existing organization structures.

While my presence as a volunteer (but also as a researcher) at the Central Florida Zoo's Orianne Center for Indigo Conservation (or 'OCIC' as it is colloquially known) was what initially gained me access, my role was also consistently under scrutiny by other members of staff and was renegotiated multiple times by the OCIC's Director. Because of existing experience (e.g. environmental organizations, animal medicine, exotic animal husbandry) I was in a position to pick up the workflow tasks of the OCIC fairly quickly. After a couple of days and a few corrections, I was able to work alongside OCIC in the daily husbandry tasks caring for the Indigo Snake residents, the Striped Newt breeding

colony, and (strictly in a distanced support capacity) with the OCIC's venomous snake ambassador collection. In addition to daily husbandry—primarily focused on cleaning and feeding tasks—I was also able to work with Michelle and Nick, the Director and a Snake Specialist respectively, on numerous off-site community outreach/education events.

Figure 3.1 *Images of the author holding #90 (adult male E. Indigo). Images taken by OCIC Director Michelle Hoffman*

During my time at the OCIC I worked on campus anywhere between 3 and 5 days a week, in addition to weekend community outreach events. Outreach events took place across northern Florida and southern Georgia. The central effort for the OCIC staff during their daily on-campus activities is focused on animal husbandry tasks: cleaning enclosures, feeding animals, and attending to any medical needs. These activities are spread out across the four categories of the animals housed on campus: breeding colony of Eastern Indigos, breeding colony of Striped Newt, and the venomous snake collection used for education. The fourth category I am including are the animals housed in quarantine as part of the OCIC's biosecurity protocols. The animals housed in the highest level of biosecurity on campus were the only animals with whom I was not allowed to work. Additionally, because

of my medical training and I also to relieve the full-time staff of my supervision, Michelle invited me to travel with her on numerous occasions to the Central Florida Zoo's main campus to visit the Zoo's veterinary hospital and observe/assist in medical procedures with some of the OCIC's Indigo residents.

The majority of data collection was centered around observing and participating in the daily, weekly, and seasonal activities of the OCIC staff on and off campus. These activities included: daily animal enclosure cleaning, daily animal collection feeding, daily medical care, weekly projects (property maintenance: mowing, weed-trimming, fence line clearing, fence building), weekly staff meetings, on-campus events (e.g. hosting a zoo educator event, hosting members of Striped Newt Working Group), and off-campus events (e.g. public outreach events, medical procedures, Striped Newt Working Group meeting). Seasonal activities included: building nesting sites in the outdoor enclosures, collecting natural nesting materials from surround forest area and placing in enclosures with gravid female Indigos, monitoring gravid females, as well as collecting eggs from enclosures and monitoring them during incubation.

Data in this chapter was derived from extensive participant observation, continuous informal interviews/conversations, and scheduled semi-structured interviews conducted with each member of the OCIC's staff (n=5). Participant observation and on-going informal interviews were conducting throughout my time working at the OCIC; this additionally includes interactions with all of the professionals I encountered during different events. Opportunities for informal interviews and conversations took place in numerous contexts: during husbandry tasks, meetings, office lunches, in the campus

workshop, during property maintenance, and in short and long car trips. Semi-structured interviews were scheduled and conducted during my final two weeks working on campus.

The Lord of the Forest: *Drymarchon couperi*

The Eastern Indigo Snake, whose taxonomic nomenclature translates to "Lord of the Forest", is North America's longest species of snake. Individuals regularly reach lengths between 5 to 7 feet (1.5 to 2 meters), with the record length exceeding 8.5 feet (2.5 meters). Prior to the decline of Eastern Indigo populations in the 20th Century, their native range stretched from eastern Mississippi to the coast of Georgia and down into all of peninsular Florida. Indigo populations declined precipitously in the mid-20th Century due to a combination of factors; including reduction in available habitat, collection for the pet-trade, and by-product deaths related to wide-spread regional activities to eradicate rattlesnakes. In the present, Indigo's are classified as "presumed extirpated" and "possibly extirpated" in Mississippi, Alabama, and the Panhandle region of Florida; with remaining strong hold populations in southeastern Georgia and peninsular Florida.

Figure 3.2 *Approximate Range of Eastern Indigo Snake - Javan Bauder*

The Eastern Indigo—like over 350 other animal species in the southeastern region (excluding southern Florida)—is reliant upon the presence of Gopher Tortoise burrows. Stevenson et.al. (2003) describe how Indigo's are "restricted to areas of xeric pine-oak sandhills, which are usually inhabited by gopher tortoises. [Indigos] use gopher tortoise burrows as shelter during the winter and during the warmer months for nesting and refuge from intense summer heat" (Stevenson et.al. 2003). Gopher Tortoises (*Gopherous polyphemus*) are a vital "keystone species" for the ecology of this region and are currently listed 'endangered' under the U.S. Endangered Species Act. Additionally, while most native snake species in the U.S. will rarely range farther than a few miles in the lifetime, the Eastern Indigo is an exception. This species has been observed to range many miles over their lifetime, with one individual documented to have travelled 27 miles from its hatch location. In combination the species' need for healthy Gopher Tortoise populations and extensive intact/contiguous habitat has facilitated their vulnerability to ecosystem change in the southeast over the last 50 years.

The OCIC: A Collective Effort to Conserve the 'Lord of The Forest'

The Central Florida Zoo's Orianne Center for Indigo Conservation was originally opened in 2012 by the Orianne Society, an environmental research and conservation non-profit organization founded in 2008 and based in the state of Georgia. The OCIC was founded as a first-of-its-kind breeding facility that focused on captive management and breeding of the Eastern Indigo Snake (*Drymarchon couperi*) for the purposes of conservation reintroductions into areas where the species had been extirpated. The Association of Zoos and Aquariums, which accredits the Central Florida Zoo and the OCIC facility, defines conservation reintroduction programs as activities in which "animals

raised or rehabilitated in AZA-accredited zoos or aquariums are released into their natural habitats…[intended for] stabilizing, reestablishing, or increasing *in-situ* animal populations that have suffered significant declines" (AZA Reintroduction Programs 2020).

The Orianne Center for Indigo Conservation, from its founding, took a novel approach to managing a captive population of Eastern Indigos for the purposes of conservation breeding. Most notable was the establishment of outdoor enclosures where adult Indigos, who are part of the breeding program, are housed year-round. The OCIC campus is situated in the middle of the Eastern Indigo's historic habitat range and their year-long exposure to natural rhythms of temperature, rainfall, and sun within their native range encourage the physiological patterns necessary for reproductive success (oriannesociety.org). The outdoor enclosures were built in two phases. An initial phase saw the completion of 12 "Outdoor Units" in 2012, and a second phase saw the completion of an additional 16 units that were funded in part by the Conservation Endowment Fund grant, awarded by the Association of Zoos and Aquariums (AZA). The outdoor enclosures were constructed between the main husbandry building known as the "Herptarium" and one of the property's permanent ponds (which is also home to a breeding pair of wild American alligators).

Figure 3.3 *(Left) Herptarium Building; (Right) Outdoor "units". Images from Oriannesociety.org*

A paramount concern when establishing a 'captive breeding colony', as they are sometimes referred, is ensuring where possible that your 'founder population' of 'breeding stock' are genetically diverse. Having a broad pool of genetic diversity is necessary to prevent a potential 'bottle-neck' event, wherein there is a loss of overall diversity and individual animals within a population share too much genetic similarity. Over a four year period from 2008 until 2012 The Orianne Society and partners collected gravid (or pregnant) female Indigos from southern Georgia. This collection program was permitted by the Georgia Department of Natural Resources (GADNR) and was done in partnership with The Orianne Society, Auburn University, and the Alabama Heritage Program. The gravid female Indigo snakes where housed at Auburn University until oviposition (egg laying), and were then returned to exact location of their capture in Georgia. Over the four year collection period a total of 18 "clutches" were hatched in captivity. A large number of these "captive-hatched" animals were raised by the herpetological team at Zoo Atlanta for eventual re-introduction into Conecuh National Forest in southern Alabama. While a number of individuals where raised back at the OCIC campus in Florida, to become part of the "reproductive colony" (The Orianne Society-OCIC 2020).

Figure 3. 4 *Image of Sign at the Central Florida Zoo's OCIC property gates; Sign still bears name of the founding organization, The Orianne Society. Image taken by author.*

In 2014 the OCIC set a reproduction record for the Eastern Indigo Snake. The center hatched a total of 67 indigos, resulting from 10 adult females and non-related males. The breeding and raising of Indigos has persisted successfully since then, with many of the animals hatched at OCIC being part of the cohorts destined to be placed back onto the landscape in southern Alabama as part of the reintroduction program. The success of the OCIC captive breeding program facilitated the establishment of an additional site for Indigo reintroduction at the Nature Conservancy's Apalachicola Bluffs and Ravines Preserve (ABRP) in Bristol, Florida.

Reintroduction activities for the Eastern Indigo Snake are guided by the Eastern Indigo Snake Reintroduction Committee. The Central Florida Zoo's Orianne Center for Indigo Conservation and partners currently have two reintroduction sites in the Southeast, both mentioned above. June 2010 marked the first release of captive raised animals into

the Conecuh National Forest in southern Alabama. With the additional release of 15 individuals in May of 2019, a total of 170 Eastern Indigos have been reintroduced into Conecuh since the project (Forest Service 2019). Apalachicola Bluffs and Ravines Preserve, a preserve managed by The Nature Conservancy, was a more recent addition to the reintroduction project. The Eastern Indigo was last seen in ABRP in 1982. The ABRP is found on the east bank of the Apalachicola river and is a 6,300 acre preserve approximately 60 miles west of Tallahassee in the Florida panhandle (FMFW 2020). The release of 15 individuals on June 11th, 2019 marked the third year of reintroduction releases in ABRP (Virata 2019).

Traversing a Captive-to-Wild Continuum in Conservation

The predominating goal of this organization—along with the multiple partner organizations and state/federal agencies—is to see the reestablishment and overall increased population of Eastern Indigos within their historical native range. Yet, the OCIC organization, staff, interns, and volunteers are the only people in the world who are breeding these animals for conservation reintroductions. They are responsible for the health, wellbeing, and general welfare of the animals in their care, as well as being uniquely responsible for the successful breeding and raising of these animals for eventual release. Without an annual cohort of hatchlings and successful rearing to release standards by the OCIC team, the Eastern Indigo conservation reintroduction program does not move forward. Additionally, once candidates for release are ready, the OCIC staff—and particularly the Director—are directly involved in the transport and release of these animals into native habitat. In many cases, the same hands that collected the freshly laid eggs and monitored them during incubation, cleaned them after newly hatching, fed them for the

first time and cared for them for 2 years to come, are the same hands that carry them into native habitat and release them down into a sandy underground burrow; bringing to a conclusion their time in captivity and beginning their time in the wild.

Nearly all of the day-to-day decision making and activities that I observed being undertaken by the OCIC staff are ultimately about successfully traversing a 'captive-to-wild continuum' alongside the animals in their care. This form of conservation practice is quite unlike that which occurs with existing wild population management. In this arena of conservation action there is an imbedded transition-in-status, from 'captive' to 'wild'. The conservation activities being undertaken by the team at the OCIC—and the other reintroduction partners—are an intensive, interventionist approach to species conservation that has been scaffolded over the last decade as these actors endeavor to see the creation of newly (re)established wild Indigo populations where they had been lost.

The daily care for these individual animals' welfare in captivity—undertaken by the OCIC's small team of staff and volunteers—are intimately wrapped up in a broader desire by these conservation actors to see this 'captive-to-wild continuum' successfully traversed. The release of individual animals into native habitats by the very hands that raised them is the penultimate physical manifestation of conservationists' desires for connection with the non-human world; a desire for connection that manifests in the Indigo's movement along the captive-to-wild continuum. Care for the animals at the OCIC should be understood as operating within that broader desire for connection to nature. In differentiation to working as a zoo keeper in more typical (captive) zoo contexts, caring for the animals at the OCIC is a more direct and material connection to regional ecologies, or the 'wild'. Because the ultimate work of the OCIC's staff with the Eastern Indigo is

understood by these actors to be an act of adding *back* to nature/the wild; with the mission of adding *into* nature being the central ethical motivation for this manner of conservation practice and the fundamental realization of these individual professionals' desires for connection *through* conservation.

"Yeah… that is the difference in working at a place like this…"

One afternoon, I was sitting at a plastic folding table in the OCIC's offices eating lunch with one of the Snake Specialists. We got on the subject of his past job and his transition a few years prior to working at the OCIC. His education and training falls into the 'traditional zoo keeper' path, having attended a technical school that specializes in zoo-keeper training. Upon finishing his training, he went to work at an AZA accredited private facility that specializes in breeding exotic species for placement in zoological institutions[25]. We then began chatting about some upcoming planned releases of Indigo's, and at one point I said, "*It must be nice to release the animals that you have been growing, that is pretty cool*." He nodded and responded,

> "Yea…you know, that is the difference in working at a place like this. My last job was primarily breeding in captivity and then spreading them out to other zoos. At least here we know that these animals are going to be **released back into the wild**.
>
> Regardless of what happens in the day to day, at least at the end of the day we know that we are going to **release these animals back into the wild and hopefully give them a leg up.**"

This is the crux of the driving motivation for the staff at the OCIC—and the myriad of stakeholders involved in the reintroduction project. There is a personal satisfaction with participating in the care of animals, that even when bred and born in captivity, are

[25] This kind of practice is often referred to as conservation via "captive assurance" populations—wherein captive populations of species are maintained as assurances against their declines in native habitats. These were some of the first practices that zoological institutions contributed to 'conservation'.

understood by these conservation actors to *belong* in the wild. And because of that understanding, their ultimate goal is to successfully shepherd them along the captive-to-wild transition and see them returned "*back to the wild*."

Gale: A Snake on the Edge of Becoming "Wild"

Near the end of February, I accompanied the OCIC's Director Michelle Hoffman to the Central Florida Zoo's main campus in Sanford, Florida. At this point, I had made multiple trips with her—in order to assist with routine stomach biopsies of snakes under medical supervision. On this day however, we were doing something unique to my time with the OCIC. A few weeks prior, one of the previously released animals from the Conecuh, Alabama reintroduction location had been tracked, located, captured, and returned to the OCIC. The field technician that was responsible for tracking and collecting her in the Conecuh National Forest decided to name her Gale. Gale had been released into the National Forest during a phase of the Indigo Reintroduction project when animals were released with a surgically implanted radio transmitter. These transmitters are approximately the size of two AAA batteries with a long, thin wire attached. Indigo snakes, as a species, are known for their 'low detectability rates.' Which means that even when a researcher 'knows' that snakes are in the area they can remain very difficult to locate and get visual confirmation. The radio transmitter allows the field research teams to monitor animals' post-release movements, survival rates, and their observable behaviors[26]. However, a reality of the surgically implanted radio trackers is that they are operated by

[26] One of the stories that was told to me, and then was used during community outreach events, was that a few years prior the field research team had been tracking reintroduced animals just a few weeks after their release, and they came across a newly-reintroduced individual eating a venomous copperhead. Indigos are opportunistic feeders, but research has shown a "dietary preference" for certain venomous snake species. And while the OCIC's animals are not fed snakes in captivity, this observation was evidence for that feeding behavior OCIC staff spoke about that animal with obvious pride.

long-term batteries and have an approximate field life of 2 years. As such, all of the animals that survived to the two year mark after initial release must be tracked and collected by the field team in order for the device to be removed by the Central Florida Zoo's Chief Veterinarian, before the battery dies[27].

Gale was housed in an a separate area of the OCIC's admin offices, in a quarantine area at the front of the building that is designated for animals that come into the facility from the wild. This is a biosecurity precaution that limits their exposure to the captive population and vice versa. Early on a Monday morning—after traveling back from an outreach event in Titusville, Florida over the weekend—we placed Gale in a cotton transport bag and then inside of a secure transport container. We drove the 20 miles southwest to the zoo campus. Upon arrival, we pulled through the gates and drove up the winding main drive before swinging to the right of the Zoo's main entrance and took a gravel service road that runs along an adjacent wetland and leads around the back of the zoo. We parked in a gravel parking lot that houses the zoo employee parking area and is surrounded by the 'operations buildings' and the heavy equipment storage. We unload Gale from the vehicle and head towards a padlocked chain-link fence that separates the parking lot from access to the backside of the main campus areas. The small animal hospital is housed in a stand-alone single story building just on the other side of the tall fence, shaded by the mature trees that are a significant feature of the Central Florida Zoo. The building is older and looks to be from the 1970's when the then-named Central Florida Zoological Park initially opened. Famous zoo and TV personality Jack Hanna was the Zoo's Director at that time.

[27] The radio transmitter protocol has been phased out of the project. Newly released animals are now marked for identification with externally visible markers.

We stepped onto the concrete pad outside of the Hospital and opened the steel door, stepping into a small hallway. The hospital has a small glass viewing window into the main treatment area on the left, a surgical suite directly at the end of the short hallway, offices off the right, and additional storage and lab space around the corner. I carried Gale's transport box to the left and into the treatment area. Dr. James Bogan DABVP, CertAqV is the Chief Veterinary Officer of the Central Florida Zoo. He and his Veterinary Technician tend to the medical needs of all animals within the CFZ's exhibit collections and conservation populations. Dr. Bogan is a fairly soft spoken man in his 40's, with short, spiky, dark hair. He is a very broadly experienced veterinarian, caring for over 100 different species at CFZ, and he always manages to have a "dad joke" at the ready.

Removing an Embodied Tether to Humanity

Michelle and I put on gloves and removed Gale from the transport container and then from the cotton transport bag. We took her weight on the scale in the treatment area—necessary for Dr. Bogan to calculate the sedation—and held her while he did a brief preanesthetic physical exam. Dr. Bogan calculated the initial sedation drugs to be administered via intra-muscular injection. Unlike mammals with their more rapid metabolic and circulatory systems, anesthesia induction in reptiles in a slower process. After the sedation injection is administered, there is a waiting period before the animal achieves a sufficient state of induction—or anesthetization—at which point the procedure preparation can begin. In snakes, one induction monitoring trait is what's called 'sustained inversion'. Basically when the animal reaches a neurological state in which the reflex to self-right, or flip right-side-up, has been overcome by the medication. At this point, it is safe to intubate the animal by placing an endotracheal tube in their trachea to deliver

oxygen and continually deliver 'gas' anesthesia. In the case of reptiles, it is also necessary to use a ventilator in order to maintain correct oxygen/carbon dioxide exchange during the procedure. Upon transferring Gale from the transport container to the surgical table, we stood back to allow Dr. Bogan and his technician to intubate, attach the ventilator/gas anesthesia, and the equipment for monitoring her vitals.

Once all of the pre-procedure processes and preparation were finished, Dr. Bogan's technician began to prep the area where he would be making the incision to remove the implanted radio transmitter that he had placed into Gale nearly two years prior. The same hands that made the initial incision to place the device that allowed her to be tracked in Conecuh National Forest for nearly 24 months were now going to remove that device, that safe-guard, that technological connection to the conservation program. He scrubbed in at the treatment area sink, put on his surgical gloves, and made a few queries of his technician to ensure everything was situated. He then took up his position at the side of the table, with Gale stretched out in front of him, manually manipulated the radio transmitter under the skin to ensure it was in the correct position, and made his initial cut—being careful to draw his scalpel along the thin dermal areas between her scales, so as to facilitate more rapid healing. Then it was just a matter of a few minutes of careful surgical dissection through tissue layers down to the small pocket that housed the transmitter for the last two years. Being mindful to fully draw out the 6 inches or so of transmission wire—attached to the device—from its site under her skin, he applied gentle traction on the device until it was fully clear of Gale's body. Dr. Bogan then placed the nearly spent transmitter on the surgical tray before taking the offered suture material from his technician and beginning to close the layers of the incision site.

Thus, with that relatively short surgical procedure, Gale crossed over a signifying threshold in her journey along the captive-to-wild conservation continuum. I remember being struck by that observation while standing a few feet away from Gale and watching the transmitter come out of her body. So much so, that I did something I often tried to avoid during my fieldwork, I pulled out my pocket notebook in front of these professionals[28], sat down on a stool and began immediately scribbling down my observations and thoughts about what had just happened. In that moment, I quickly wrote about watching the removal of a "tether to humanity" that had been placed inside of Gale. About how that transmitter was simultaneously a material—technological—*and* metaphorical tether that tied Gale to humans. That device, which had been placed within her body, was a literal embodiment of connections between Gale and the multitude of stakeholders involved in activities to conserve her species. That transmitter was an action that sought to strengthen the ties between Gale and conservationists during her initial phase of reintroduction. Technology that provided a mechanism for conservation actors to map her activities upon the landscape. Ultimately, with the removal of that device and the severing of the radio waves connecting Gale to conservationists through space, she was free of that embodied 'tether to humanity' and as a result had progressed further along the process of *becoming* wild.

The Multi-Species Body as "Wild"

In addition to the removal of a 'technological tether to humanity', the medical team and Michelle observed another marker of Gale's transition along the captive-to-wild

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[28] In my experience, working with scientists and practitioners makes public note taking extra-difficult. It has an almost immediate effect of drawing to their conscious attention that you are there, not just to observe conservation programming, but to observe *them*. They want to know what you found interesting about what just happened in that moment. And while it is a consistent element of my research practice to navigate those interactions candidly and with transparency, at times I found myself wishing I had a photographic memory so as to not interrupt a poignant moment with the need to document.

continuum during that visit. Once Dr. Bogan had completed the surgical procedure to remove the implanted radio transmitter, he moved on to perform a few additional diagnostics. As Chief Veterinary Officer, he provides care for all of the OCIC Indigo's in the breeding program; as such, having a 'returned' animal in for a procedure is a learning opportunity about their lives since they left captivity. While Gale was still sedated Dr. Bogan was using an endoscope—a tubular device with a light and camera at one end—to examine her mouth/throat. While peering through the viewfinder of the device he chuffed a little and said, **"<Ha>** ***She has parasites."*** At which point, everyone in the treatment area exclaimed and immediately looked towards the screen to where he was able to project what the camera was seeing inside Gale. There in the middle of the screen were the pinkish ridges and folds of tissue and he was able to place the camera right in front of a parasitic flatworm that was crawling up Gale's throat towards her mouth. Upon further inspection with the endoscope, as well as visual inspections of her mouth, it became clear that there were actually numerous flatworms moving along her esophageal-gastric track, likely spurred to move out of the body in response to the sedation.

While collecting the manually removed flatworms from Dr. Bogan and Michelle in a sample jar, his technician was looking at Gale, still sedated on the table, and shaking her head with a sort of bemused smile on her face and speaking to the snake, she said with a kind of mock-exasperation: **"*We put you back into the wild and you got worms.*"** This was immediately followed by Michelle agreeing with this statement by saying rather proudly: **"*She is a wild snake. We have a wild Indigo now.*"**

We concluded the work on Gale and began the process of recovering her from the anesthesia—manually breathing for her via her endotracheal intubation tube and a hand

respirator bag. Giving precisely counted deliveries of oxygen while also monitoring and documenting her slowly increasing heartrate on the hospitals anesthesia recovery form. Once Gale had sufficiently recovered, she was placed back in the transport carrier and Michelle and I headed back to the OCIC campus.

It is understandable that for people who do not work in animal medicine, or with animals more generally, the image of internal parasites crawling up an esophagus might seem like a worst nightmare scenario. However, in that setting with Gale—an animal who had spent nearly 2 years on the landscape in Alabama's Conecuh National Forest after being born and hand raised at the OCIC—seeing these parasites was a marker of significance in her status transition. Observing these organisms within Gale elicited excitement and curiosity, not dismay, from all of the people present. These flatworms, to whom Gale was playing host, represented a different kind of connection, a different kind of 'tether'. The radio transmitter surgically implanted within Gale prior to her release 2 years previously was a technological and metaphorical tether to conservationists and conservation goals. The transmitter literally connected Gale, through radio waves, to conservation actors. But, these new organisms that were residing within Gale were a tether to her native habitat and its ecologies, in Conecuh. On the same day that her techno-connection to conservationists was removed, some of those same conservationists were able to visually observe Gale's multispecies body, and they marked this new reality as a signifier of her status-as-wild. The world outside of captivity is messier, less sterile, and more interconnected. Captive populations are medically managed for parasites[29] because

[29] The observable parasites were manually removed by Dr. Bogan and Michelle, and Dr. Bogan's technician collected samples to preserve and to examine in the small lab down the hall.

of their potential impact on overall health, but native ecologies—as interconnected webs of organisms—are a multispecies reality, in the most literal usage of the term. As such, Gale's multispecies body was a powerful signifier of her integration into that messy, connected, ecological reality—and a loosening of her connections to conservation and human worlds.

"Okay…I know…you know what to do…"

Jumping forward in time a few weeks, it was a Monday in March and I had spent part of the morning working with Cheryl—one of the Snake Specialists—cleaning all of the animal enclosures in the Herptarium. In the afternoon, after working on the outdoor enclosures and preparing nesting materials for the "gravid" females (those suspected of carrying eggs), Michelle walked up the hill to ask if I could take a few photos of Gale for public outreach materials. I always carried my DSLR camera during fieldwork and she wanted some higher quality photos, so we walked back down the gravel road to the offices in order to collect Gale from the quarantine area. We took her outside underneath some of the surrounding pine trees and worked with her to get a few shots. The figure below is the (eventual) result of those photos.

Figure 3.5 *An image of "Gale" at the OCIC prior to re-release. Image taken by author.*

However, our attempts to get photos of Gale were made more difficult because as soon as her body met the pine needle covered ground she would immediately start trying to move off for cover under the nearby shrubs—a behavior that is less common with long-term captive individuals that are more acclimated to humans and handling. As a result, we took turns handling Gale and the camera, holding her up until the camera was in position and then quickly setting her down and moving out of the frame. Interestingly, Nick—the Snake Specialist who had actually trained Michelle years before when she first began working at the Zoo—had previously described to me how one of his favorite parts of working with snakes (especially venomous snakes in Nick's case) was,

> "Learning how to move around the animals. What elicits this, what elicits that? I mean, **movement is how these animals communicate**. That is why people don't think they are intelligent. Because they just don't understand that."

At one point while juggling her, Gale's behavior prompted Michelle to look down and say directly to her with mock exasperation, ***"Okay, I* know *you are a wild a snake now and you 'know what to do'."*** Her tone was similar to that of a parent talking to a

child that had reached a certain milestone of growing up, where the parent grudgingly—yet proudly—recognizes an element of the child's newly found abilities and independence. In this interaction I was observing an additional feature of how these conservationists came to see and to understand where Gale was along her captive-to-wild transition. As Nick had said to me, "*movement is how these animals communicate*"; both how they communicate in the moment, but also in this context how they communicate about themselves more broadly. Gale's behavior was only significant to Michelle in that moment because of her own experience and understanding of these animals. It is because of that experience—born of thousands of hours of interaction and observation—that Michelle was able to identify that signifying change. To these conservationists, Gale's movements were communicating about her status as 'wild' and along with that status comes an understanding on the part of the conservationists that Gale "*knows what to do*" [in the wild]—and by extension has entered into a new state of independence from the humans that cared for her and about her along the way.

While handling her outside Michelle also noticed a few small bumps between her scales. She brought Gale out from under the tree canopy into a patch of direct sunlight to check them more closely and discovered that they were, in fact, ticks. Small external parasites imbedded in the interstitial epidermal layer between the individual scales. Michelle shook her head with slight incredulity before looking up at me saying, **"*Huh…she has ticks.*"** We discussed how these must have been 'seed ticks'—the larval life stage where ticks are too small to be seen—when Gale arrived from Conecuh and first visited the hospital. We finished up the pictures and headed back indoors into the offices to do a more thorough inspection and remove any visible external parasites. Once inside,

Michelle called out to Cheryl, who was working at one of the desks in the other room, to share that we had just found ticks on Gale. Unprompted, Cheryl rounded the corner to where we were standing and matter-of-factly proclaimed, ***"Whelp, she is a wild snake now!"***

Connections Through Conservation

From my outsider's perspective, it was the surgical removal of the radio transmitter embedded within the physical body of the snake—a literal embodied connection with conservationists and conservation priorities—that marked a moment of significance in the end stages of the captive-to-wild transition. But for the conservationists themselves, it was the presence of parasitic organisms, internal and external, that signified Gale as a "wild" snake. As though the presence of other organisms inside and outside of her body, those that are preventatively managed in captivity, were the most apparent evidence of her successful entry into the native ecologies. In addition to her new reality playing host to organisms from her native habitat, Gale's change in behaviors—a change readable to staff at the OCIC reliant upon their knowledge and experience—further marked her as 'wild'. Observed by Michelle, these changes were a signal of Gale's recently acquired knowledge about what a 'wild snake' needs to "to do" on the landscape. As Nick had said to me, movement is how these animals "communicate", and Gale's behavioral movements had the effect of communicating to these professionals about her acquired 'knowledge' of the wild; representing her *status* along the captive-the-wild continuum.

A short time after I left the OCIC in the spring of 2019 Gale was returned to the Conecuh National Forest in Alabama. A journey that was arguably the final step towards completing her transition along the captive-to-wild continuum. Gale serves as an example

of an actualized ideal for the OCIC and other partners involved in the Indigo Reintroduction Program. She is a marker of snakes that have passed through years and generations, intermediated by human action and care, in order to return '*back to the wild*'. Though, it is not only a return of individual animals to native ranges and habitats, but also marking a potential for the re-establishment of a healthy species population onto landscapes where they had been absent for decades. Conservationists adding a species back to nature that humans were largely responsible for subtracting from it. Gale, and her successful traversing of the captive-to-wild continuum, was a marker of hope for these conservationists. This individual snake, and others like her that also reached this stage of the reintroduction program, are imbued with the invested hope of the humans who have cared for her individually—those at the OCIC, and of the project and its stakeholders more broadly. This conservation project is about a specific species, yes. But like other species-based conservation activities, it is also about hope for native habitats, wider ecologies, and regional landscapes [of the southeastern United States]. Gale and the other Indigos who are now surviving as 'wild snakes' on that landscape are individual animals with individual connections to particular conservationists, but they are also material and metaphorical manifestations of hope for possible ecological futures.

Finally, similar to the OCIC professionals' identification of other organisms—to whom Gale was playing host—as being representative of her integration into the messier and more interconnected realities of native ecologies, I argue for a recognition of the features of the Indigo Reintroduction Project as representative of potential realities for conservation futures. Futures that, secondary to the challenges of ongoing ecological change, will be characterized by conservation interventions that rely on more intimately

interconnecting vulnerable components of nature with professionals who are motivated to form connections with species, ecologies, and landscapes in order to see them persist into uncertain environmental futures.

January 2020: A New Marker of Hope for the Eastern Indigo

A significant manifestation of hope for those ecological futures was experienced by the Indigo Reintroduction conservationists after I had finished my work with them in 2019. In January of 2020, the first "wild" Eastern Indigo offspring was found in Conecuh National Forest in Alabama. The individual was just 27 inches (68.5cm) in length and was the first wild indigo observed in the National Forest since 1954. In a public interview about the finding, Alabama Natural Heritage Program biologist Jim Godwin said,

> "We're releasing these snakes that are all generally about two years old, with the hope, and the expectation that eventually the snakes will survive from year to year and breed in the wild…It's very exciting for us to find this young snake that confirms one measure of success that we've been after all along."
>
> The snake was a part of Alabama. Not well known, but a part of Alabama and southern Alabama. And as the importance of the longleaf pine ecosystem has really come out in the last couple of decades, we've been missing pieces of that, restoring that ecosystem." (Georgiou 2020)

Figure 3.6 *Image of wild-born juvenile Indigo (2020)*

The snake had been identified by a group of researchers from Auburn University who were in Conecuh National Forest conducting research on Gopher Tortoise burrows in the Longleaf Pine ecosystems. The Eastern Indigo, in the northern stretches of its range, are "closely associated" with Gopher tortoise burrows who are in turn associated with Longleaf Pine habitats. The reintroduction program in Conecuh is in its 14th year and in that time more than 160 Indigos have been released in the National Forest as part of the larger Longleaf Pine Forest ecosystem restoration project. The snake found by the researchers was estimated to be seven to eight months old in January 2020, meaning it was the product of a breeding event between two adult Indigos in the winter of 2018-2019. At the same time I was working at the OCIC, helping care for captive hatchlings and monitoring newly laid eggs alongside the animal care staff, this little snake's parents—former babies from that very project, were going through their reproductive patterns in the wild to produce the first observed wild-born *Drymarchon couperi* in seven decades, in Alabama's Conecuh National Forest.

Chapter 4: Scientific Politics Within Conservation

Speaking to a small audience of about 25 people in a Seattle convention center in 2018 Dan Ashe, the former Director of the United States Fish and Wildlife Service (USFWS), spoke about his personal experiences and positions regarding wildlife conservation. At one point, he addressed his personal views on the relatively recent emergence of 'Human Dimensions of Conservation', within the field. He said this:

> "…over the last couple of decades…there has been an emerging movement of people that want to talk about the 'human dimension of conservation' and I think that has been a healthy conversation…although in the last couple of years, increasingly I have realized that…there's a little bit of irony in that because …what is the *non-human* [original emphasis] part of conservation? And so there is a little bit of danger in separating those things out. Because conservation is a human…is a values based construct. We conserve animals because we know that our existence on the planet is compromising the well-being of other beings on the planet, and so we endeavor to conserve them. It's a *completely* [original emphasis] human construct."

In this statement, Ashe was establishing that for him, there is no 'non-human' aspects of conservation—at least not in the way that conservation actors have historically organized their thinking of the field and their own activities within it. As Minteer and Collins (2012) have discussed, the body of internal logics that have historically underpinned and informed the philosophies of environmental conservation have maintained a distanced relationship between humans and nature. This logic *includes* the position of the conservationists, themselves. Who, even though they are acting on behalf of 'nature', are still conceptually and philosophically separate from it—within conservation logics. Thusly conservation, as the collective manifestation of their philosophies and actions, was also separate from nature while actively seeking to preserve it. Ashe, as a career conservationist, described the potential pitfalls in this kind of internal

logics. He pointed out how, Human Dimensions of Conservation as an area of study and attention, developed out of emergent conservation understandings about the need to understand and include non-scientific publics and stakeholders in their examinations of environmental questions and in any subsequent decision making. This thinking gave rise to models like Community Based Natural Resource Management (CBNRM) etc.. Yet, one of the significant "*ironies*" and "*dangers*" that Ashe observed in this dichotomy of Conservation vs. its 'Human Dimensions' is the destructive perpetuation of the underpinning philosophies that understand conservationists and their actions to be separate from and outside of the socio-ecological networks of 'nature' they are invested in conserving. From within conservation logics, 'human dimensions' analyses are only oriented to address the human-environment relations of *other* populations and how they influence conservation activities, not those of conservationists themselves. But as Ashe stated, there is no—and can be no—'non-human' aspects of conservation precisely because the conservation*ist* is always present. "*Conservation…is a values based construct….It is a completely human construct*." Ashe understood that conservation is not politically neutral, it is not some pre-conscious occurrence, it is an historically situated body of philosophies and practices that are constructed and enacted by people. Ashe pointed to the dangers of not insisting that conservationists acknowledge and reflect on those values that shape conservation priorities and the ways that conservationists act within the world.

During my time working alongside conservationists and conceptually mapping the shape of their activities, I consistently observed these professionals negotiating complex fields of values, knowledge politics, and priorities that collectively interwove to shape the contours of the diverse conservation activities in which they were engaged. These

negotiations often played between and across scales of participation through the various categories of actors involved (e.g. individuals, organizations, state & federal institutions), as they influenced a 'conservation politic' in the face of increasing socio-ecological uncertainty. An important feature of conservationists' experiences negotiating these contours that I continually witnessed, were the impacts of *internal* conservation clashes. As I observed them, most often these clashes were the consequence of competing priorities as different actors within the wider conservation arena sought to enact their (conflicting) priorities. Of particular salience in shaping these conservation activities were the disputes resulting from misaligned scientific politics—carried by different actors—coming into friction, in the real world.

I argue that understanding the 'contextual realities' of environmental conservation necessarily entails critical explorations of these sorts of scientific politics that constrain, conflict, motivate, or in other ways influence the activities of conservation(ists)—especially those who are engaged in activities outside of the transnational 'parks and people' category, and are thusly underexamined in anthropological literature. In this chapter I investigate the conflicting politics of science that affect how different groups of conservationists materially act in the world and trace the impacts on the bio-physical components of nature with which they are engaged. To that end, this chapter's case examples and discussions are a product of this project's wider commitment to moving beyond monolithic treatments of conservation by analyzing the dynamic realties that shape different forms of conservation activities (Larsen and Brockington 2020)—across scales (Crate 2011)—and by concentrating on conservationists as ethnographic subjects in order to humanize those analyses (Kiik 218). Additionally, while this wider project is situated

within a gap in the anthropological literature in regards to ethnographic inclusion of conservation actors and diverse conservation interventions, this chapter is connected with those anthropological scholars from the last two decades who did work to interweave—from various orientations and to differing degrees—both conservation professionals and the politics of scientific thinking, values, and processes into their ethnographic investigations of conservation actions (Lowe 2006, Choy 2011, Parreñas 2018, Wanderer 2020). Importantly, I found the heuristic device of "friction" (Tsing 2005) to be a constructive lens through which to examine the influences of environmental scientific politics within conservation. While adapted from Tsing's original usage, through this lens I came to conceptually visualize the species and ecologies of conservation concern—and the various human actors who embody that concern (e.g. conservationists, zoo orgs, enviro orgs, state/federal agencies etc.)—as being shaped into particular relational formations by the frictions of misaligned scientific encounters. In this way, it is important that these clashes not be visualized as something like two billiard balls coming into brief and forceful contact before spinning off in different directions. Rather, these convergences are instances of coming together in which these misaligned scientific encounters bring together constellations of non-human nature and human actors, and upon their convergence, the incumbent forces of friction succeed in (re)shaping particular socio-ecological formations of conservation activities in their wake.

As Dan Ashe stated, "*conservation is a human values based construct*"—and while this statement may not be novel within the critical social sciences, we must ensure that we extend our investigations to contextually examine the heterogeneity of those values, priorities, politics, and actions that are engaged in such entanglements, which affect the

experiences of conservation professionals and subsequently shape the real world contours of contemporary conservation activities.

FIELDWORK AND METHODS

The data in this chapter are derived from multiple field sites with the chapter organized into three sections, each distinguished by an examination of different categories of scientific politics. This chapter is a synthesis of data from formal and informal interviews, observation and participant observation, as well as document research of relevant legislation, reports, press releases, and other public medias.

The first section examines the politics of native-ness, seen through the lens of one conflicting species in Colorado's Rocky Mountains. This example was seeded from an ethnographic encounter with the North American Mountain Goat (*Oreamnos americanus*) while conducting wildlife survey work during the summer of 2019. Following this encounter in the field, the subject of the goat's native-ness and conflicts over the species' introductions popped up in multiple informal conversations during my time in Colorado. Additional background, context, and details were provided via document research into media publications, scientific articles, and other public records.

The second section—investigating the 'politics of listing'—orients around case examples from two conservation programs, from two different organizations. First, the American Pika (*Ochotona princeps*) found at high elevations in the Rocky Mountains, and second the Striped Newt (*Notophthlamus perstriatus*) found in ephemeral wetlands of southeastern Georgia and northern Florida. Data addressing the American Pika example were collected during time spent working in the Rocking Mountains in the summer field seasons of 2018 and 2019. In addition to my time spent with team members as a research

assistant conducting wildlife surveys and monitoring, and my time assisting in the training of citizen science volunteers, data for this section were derived from state and federal documents, press releases, and public media sources. Data addressing the Striped Newt case were collected during my time working for the Central Florida Zoo's Orianne Center for Indigo Conservation (OCIC) in 2019. While the OCIC, as the name delineates, primarily specializes in conservation breeding and reintroduction of the Eastern Indigo snake, they have a secondary conservation breeding project focused on the Striped Newt. In the spring of 2019 I was able to assist with aspects of the Striped Newt project, and I was also able to attend the Striped Newt Working Group meeting, hosted at the Central Florida Zoo's main campus in Sanford, Florida. The meeting was followed by an additional day of working group activities at the OCIC campus and in the surrounding Seminole State Forest.

The third section, contending with the tensions emanating from the politics of taxonomic classification and real-world conservation implications, also came about during the months I spent working with the Orianne Center for Indigo Conservation in central Florida. The data supporting this section derive from observations and informal conversations had over the months I was present at the OCIC in the midst of this conflict. Additional context and examination comes through internet based research, analysis of documents, press releases, and the published study articles that were at the heart of the conflict.

Colorado's Goats?
Native Politics and Patchwork Conservation Landscapes

I encountered facets of the politics of 'native-ness' in multiple contexts during my fieldwork. During my two summers in Colorado, I worked with a few different

organizations and their active conservation and research programs. After an initial period in 2018, I was invited back to Colorado by Erica Garroutte of the Denver Zoo Field Conservation Department (FCON) to serve as a Summer Field Assistant in 2019. My time as a field assistant was split between duties on two primary projects jointly run by the Denver Zoo FCON and Rocky Mountain Wild—a local non-profit environmental advocacy and action organization. Those two projects, The Front Range Pika Project and the Colorado Corridors Project both focused on the ecosystems and wildlife of Colorado's Rocky Mountains. The bio-physical ecosystem landscape of the Colorado Rockies is a patchwork of 'biotic zones' that includes Alpine Tundra, Spruce-Fir Forest, Montane Seral Forests (e.g. Aspen Groves), and Riparian/Canyon Woodlands, among others. Most of my direct experience of Colorado biotic zones was with those listed.

As a field assistant in 2019 part of my responsibilities included executing weeklong data collection trips for an expansion of the Front Range Pika Project into the White River National Forest. These trips took myself and permanent employee Brad Schrom to sites across much of the central sections of the Colorado Rockies. Including habitat areas in and around Rocky Mountain National Park, Vail, Breckinridge, and Aspen.

At one point in the middle of the summer season around mid-July, Brad and I were camping in a forested area up above the mountain ski town of Breckinridge. We base-camped there for a couple of days—setting up our site in a single location, and leaving early in the morning to drive to our trailhead in the Denver Zoo's field vehicle and returning in the afternoons. On a Wednesday morning, the alarm on my watch started going off at 5:45am. I crawled out of my sleeping bag and pulled on my hiking clothes, boots, and a jacket. Even in mid-July at the elevation of our campsite it was still in the 40's, early in

the mornings. Brad was still asleep in his tent, catching the last few possible minutes, when I quietly walked past it towards the fire ring. This had become our routine on these site survey trips. As anyone who has regularly camped with a partner, you tend to fall into your preferred roles at camp. One of mine was getting up first and setting up my Jet-Boil to boil water for coffee. I like to have a slower start to the morning, so I will generally trade a little bit of sleep for time to sit and sip my coffee as the world transitions in the emergent morning light. 15-20 minutes later and I was drinking my coffee when I heard Brad's alarm and the by then-familiar sounds of him getting his own start to the day. I grabbed his mug from the food supplies and poured his coffee as he opened his tent. He emerged from his tent and whispered his usual sleepy "*thank you*" as he picked up his mug to take a sip. We spent a few more minutes waking up in the hazy blue morning light before it was time to pack our day-bags, leave camp, and head to the field-vehicle. As a full time Denver Zoo/Rocky Mountain Wild employee, Brad was in charge of the logistics for site surveys and campsites. On these trips we typically tried to hit 4 to 5 sites in a week-long trip and we would try to find a campsite that was centrally located; leaving us a 45min to 1hr drive every morning to get the trail head. Additionally, in Colorado it is considered best practice to be 'off mountain'—or at the very least 'below tree line'—by 12 or 1pm. The weather changes swiftly when you are hiking between 8,000 and 12,000+ feet in elevation, and improper planning could mean being caught in the near daily afternoon lightning storms that roll across the mountain range (this is the reason why we always taught alpine lightening safety at all Citizen Science trainings). You don't want to be the tallest thing around when an alpine storm rolls through.

Coffee finished and day-packs ready we climbed in the Toyota 4runner and headed down the mountain away from our campsite and then southwest towards the trailhead of McCullough Gulch Trail. McCullough Gulch is an 'out-and-back' style trail at little over 6 miles, and it is accessed along the same Forest Service road as Quandary Peak trailhead, a popular "14er" for summiteers[30]. McCullough has an average hike time of approximately 4 hours with an elevation gain of 1,500 ft from the trailhead; the trial is rated as Difficult/Hard. So, if you factor in hike time, site survey times, and a need to be off the trail by noon-ish, we needed to start the hike by no later than 7am. This was our routine for planning every hike; factor in all of the trail characteristics, our own abilities, and contingencies to plan out when to begin. On these hikes we were also recording our "track" via a GPS app so that future Citizen Science volunteers could follow our route to the sites.

We parked at the trail head, check our gear, double checked our GPS and site survey equipment—visually and verbally confirmed who had what gear—and then set out on the trail. It was on this hike, after about 1.5 hrs and near the top of the elevation gains that we encountered our first significant snow fields, at around 12,500ft. It was July but after the 2018-2019 winter snowpack, there would likely be snow on the ground right through summer and into the first snows of late summer/fall. It was while looking upwards along the trail—the incline of the trial is so significant at that point in the hike that you were literally craning your neck back to follow the path of the trail through the trees above—that I glimpsed a patch of white moving between the trees. On these hikes I typically led and acted as "pace-setter", so I saw the movement before Brad, who was walking a few

[30] 14ers are mountain peaks that reach over 14,000 feet in elevations. Summitting 14ers (as they are locally known) is a very popular summer hobby and Colorado has the most of any state in the U.S. at 58 total peaks. To hike a 14er and be 'off mountain' by noon, most hikers begin in the dark well before sunrise.

yards behind me. I kept an eye on the movement and gave Brad a verbal warning to let him know that there might be something on the trail ahead. As we continued to climb and rounded a bend in the trail, we saw clearly for the first time that the white coloration belonged to an adult Mountain Goat (*Oreamnos americanus*), that is standing in the middle of the trail. The goat was maybe only 20-25 yards ahead of us, however, because of the inclines it was also above us by 10-15 vertical yards; meaning we were looking up at its belly from below as it looked calmly down on us from the rocks. Mountain Goats are generally quite relaxed and unphased in their habitat. Ungainly humans do not pose much of threat to this species in that environment; a few quick, surefooted bounds over the rocks and it would easily be out of sight. Yet, this one was just standing on the trail and watching us; quite unbothered about moving along. Brad and I stood quietly and watched for a bit, admiring the sight—it was my first goat sighting. Eventually however, we realized that this particular goat was not likely to head on its way and we were going to need to put some physical pressure on it by gently closing the distance gap between us, and encouraging it to move off trail. So, while talking to the goat—yes, I am the kind of person that explains to the wild Mountain Goat that I needed it to step off the trail so that we could continue—we gently made our way up the slope. I was leading, while making more noise than I normally would on the trail. The goat tolerated our closing proximity momentarily before deciding to move along up the slope of the trail, eventually picking a line up a nearby rock face. Brad and I passed the now off-trail goat—standing 30 yards away on a rocky outcropping--and continued on our way. Checking over our shoulders to ensure that it continued to move off and that we were keeping an appropriate distance.

Oreamnos americanus, also known as the Rocky Mountain Goat, range between 100 and 300 lbs in size with powerful fore and hind limbs for scaling rock faces, as well as a relatively small head with backwards curving horns. This sighting of Colorado's Mountain Goats while on a wildlife survey hike for another of the state's alpine species, was significant. Because, as Brad would later tell me during our drive back to our campsite, there is quite a bit of tension within the regional wildlife conservation community about whether they truly are '*Colorado's* Mountain Goats'.

Figure 4.1 *(Left) Moose*[31]*; (Center) Big Horn Sheep; (Right) Mountain Goat*
https://idfg.idaho.gov/rules/21-22-moose-sheep-goat-proposals

The Mountain Goats of Colorado were first 'introduced' in 1947, from a source population in Montana. They are widely considered native to Alaska, the Canadian Rockies, Washington, Oregon, Idaho, and Montana. Multiple translocations occurred over a few decades bringing Goats to Colorado; with the final introduction in 1972. It is estimated that 55-60 goats were moved to Colorado during this time, but their population has grown into the estimated thousands. Professor Jeff Mitton writes that, "[Mountain Goats] were introduced to Mount Evans, the Needle Mountains, the Ragged Mountains,

[31] Moose are also an introduced species to Colorado; with the first translocations occurring in the 1970's.

the Gore Range and Sawatch Range. From those sites, they have spread to the San Juan Mountains, the Elk and West Elk Mountains, the Ruby Mountains, the Mosquito Range, the Front Range and Grand Mesa" (Mitton 2019).

While there is ongoing debate from different camps within the ecological research and conservation communities, Mitton describes how in his view most professional biologists still designate Oreamnos americanus as an 'introduced non-native species' within the Colorado Rockies. The original goat introductions and subsequent population management in the mountain range was—and has remained—part of Colorado's recreational hunting industry[32]. To that end, in 1993 the Colorado Wildlife Commission was approached by the International Order of Mountain Goats—a species advocacy group—that requested the Commission designate the Mountain Goat as "native." That designation was granted in March 11, 1993. The final clause of that original statement reads:

> NOW, THEREFORE BE IT RESOLVED, that the Colorado Wildlife Commission hereby acknowledges that the Rocky Mountain Goat (*Oreamnos Americanus*), has inhabited numerous parts of the state of Colorado prior to reintroduction in 1948 and that that Rocky Mountain Goat is an indigenous (native) species of Colorado. 03/11/1993

Citing predominantly "literary evidence" compiled by a University of Northern Colorado graduate student in the 1990's, the International Order of Mountain Goats refers to the Goat translocations as a (re)introduction, denoting that the species—which they argue was present in Colorado until the 1800's—has been returned, rather than introduced. Mitton, on the other hand, points out that "as mountain goat numbers have grown, bighorn

[32] Professor Mitton (2019) has documented that in 2018 the state of Colorado issued 208 licenses for Mountain Goat hunting, and 174 animals were "taken"; hunting licenses for Mountain Goats are $300 for residents and $2,200 for non-residents.

sheep numbers have declined." He also describes how other scientists, like Professor Bill Weber, have "sounded the alarm" that too many goats (and people) were threatening the Arctic Tundra plant communities around Summit Lake, Colorado. Additionally as Bruce Gill (2010) documented, the Mountain Goats were observed for the first time in Rocky Mountain National Park in the summer of 1997. This prompted the National Park Service to commission a study from Dr. Bruce Wunder of Colorado State University. Wunder (2000) concluded "goats were not native to Colorado, goats would out compete resident bighorn sheep, and if goats became concentrated that could be destructive to native vegetation." The National Park Service continues to designate Mountain Goats as "alien" species that threaten native species and habitats—particularly alpine vegetation and bighorn sheep. The Park Service has a policy of trapping goats when possible, and shooting individuals when trapping is deemed not viable.

Gill refers to this situation as "Dueling PhDs". It is this landscape of conflicting designations and statuses that comprises aspects of contemporary conservation politics. Going beyond rather simplistic conceptualizations of what constitutes 'nature', and into the realm of patchwork statuses applied to species by different groups of conservation actors. And when those competing groups maintain management control over different protected areas, as in the case of the Mountain Goats in Colorado, it is perfectly possible for an animal to walk across a human designation and immediately its place in the world and in the surrounding ecology shifts. An animal whose ancestors were moved by humans from Montana to Colorado in the mid-20th century, can walk across a human demarcation—drawn by conflicting scientific politics—in the landscape and in so doing can transition from "(re)introduced native/indigenous" to "introduced/non-native/alien/threat"

categorizations. This mixture of scientific politics and priorities plays out in scientific journals, in bureaucratic management meetings, on the physical landscapes and ecosystems of the region, and in the material lives of the species and individual animals that are affected by human decision making.

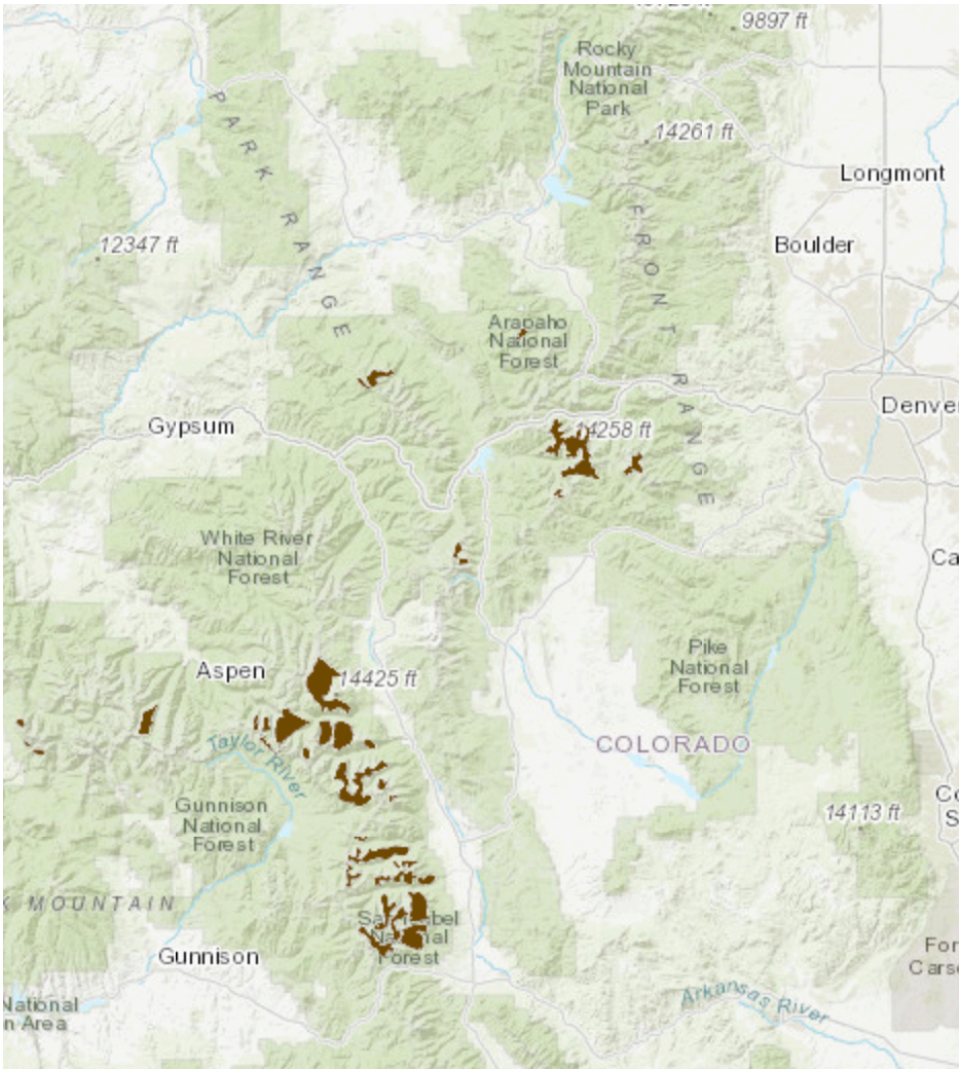

Figure 4.2 *Map of Goat 'Concentration Areas' (2011)*
Map is property of Colorado Division of Wildlife

Ultimately these conflicting scientific knowledge politics participate in the shaping of a material 'patchwork' conservation landscape. Wherein different corners of the Rocky Mountain region are controlled by different actors that hold competing views on the 'status'

of a particular species, in regards to its 'native-ness' on that landscape. The result of these conflicting environmental politics is that the animals in question, exist in a liminal state of belonging within the ecoregion dependent upon the scientific politics of the human actors that control the land.

To List or Not to List? Politics of Species' Vulnerability & Conservation Action

Background on U.S. Species Protection Efforts

In the United States the landmark federal species conservation legislation is known as the Endangered Species Act or ESA. It was signed into law by then President Richard Nixon in 1973. The legislation is charged with the protection of critically imperiled species from extinction as a "consequence of economic growth and development untampered by adequate concern and conservation."

Briefly describing the history of federation species conservation legislation in the U.S., the United States Fish and Wildlife Service states:

> "Federal protection of endangered species dates back to the Lacey Act of 1900, when Congress passed the first wildlife law in response to growing public concern over the decline of the passenger pigeon (*Ectopistes migratorius*). The Lacey Act prohibited interstate commerce of animals killed illegally and required the secretary of agriculture to preserve, introduce, distribute, and restore wild bird and game bird.
>
> As public awareness of environmental problems initiated political activism in the 1960s, the Department of Interior formed a Committee on Rare and Endangered Wildlife Species to identify species in immediate danger of extinction. The Redbook on Rare and Endangered Fish and Wildlife of the United States, published in 1964, served as the first official document listing species the federal government considered to be in danger of extinction." (USFWS Endangered Species Act 2020)

Following the creation of the Redbook list, the United States congress passed the first piece of comprehensive legislation with the explicit intent to protect some endangered species: *The 1966 Endangered Species Preservation Act*. According to the USFWS it was under this 1966 legislation that the first list of threatened and endangered species was

created. The 1966 legislation was amended in 1969 by the *Endangered Species Conservation Act*, which expanded federal protections to species beyond "game and wild bird", which were the focus in 1966. In 1972 President Nixon addressed the inadequacies of the 1966 and 1969 legislations, calling on Congress to pass truly comprehensive legislation. He signed the Endangered Species Act on December 28th, 1973. Some familiar species that were part of the original protection lists in the 1960's and 70's include: Florida Manatee (Trichechus manatus latirostris), Grizzly Bear (Ursus arctos horribilis), and California Condor (Gymnogyps californianus).

The ESA, as written, has two primary missions. First, to designate qualifying species as either Threatened or Endangered—through a process of petition and status review—granting them protection under the law intended to prevent extinction events. Second is to persist in recovery efforts for designated species until they no longer require protection under the ESA. As a functional result, once a species is designated (AKA "listed") under the ESA, the legislation lays a path for the U.S. Fish and Wildlife Service and the National Marine Fisheries Service (NMFS) to "protect species and the ecosystems upon which they depend." Allowing for a myriad of recovery efforts, both of habitats and direct species populations, with the eventual goal of "delisting" once recovery efforts achieve a stable population no longer imperiled with extinction[33].

The recovery activities that can be undertaken once a species has been granted either Threatened or Endangered status under the ESA, can take varied forms. However,

[33] Increasingly there have been ongoing conflicts over the 'de-listing' process, as defined the USFWS. During his time as Director, Dan Ashe over saw the planned de-listing of the U.S. Gray Wolf population which the USFWS claimed was 'recovered'—this decision removed federal protections and allowed for the reinstatement of wolf-hunts throughout the range. I was able to hear directly from Ashe about this conflict during the same small conference session quoted at the beginning of this chapter.

while species and ecosystem conservation actors are granted considerably more opportunities to enact diverse conservation activities once a declining species has been granted Threatened or Endangered status under the ESA, those designations are quite often a struggle to achieve. As of summer 2020 the Endangered Species Act currently has 2,244 species listed as either threatened or endangered, of those, 1,618 are in the United States. The U.S. species include: 884 plants; 307 invertebrates, 163 fishes; 95 birds; 96 mammals; 36 reptiles, 35 amphibians, two fungi (USFWS 2020).

Politics of Listing: Two Species

During my fieldwork I encountered two species-conservation and research programs at two separate institutions, for species that had previously been *denied* listing under the ESA. The 'politics of listing' is a productive window through which to see aspects of the scientific politics that plays out in conservation arenas. In the U.S. where species 'statuses' are granted independently by State and Federal environmental agencies—with the Federal ESA being significantly more influential—conservationists' fight to conserve species and habitats in the U.S. often occurs through the prism of ESA listing politics.

American Pika *(Ochotona princeps)*

In 2007 the Center for Biological Diversity (CBD) filed a petition with the USFWS to list the American Pika (Ochotona princeps) under the ESA. According to their own press release, the FWS advised the CBD in 2007 that the petition "could not be addressed at that time because existing court orders and settlement agreements for other listing actions required nearly all of the listing funding" (FWS Press Release 2010). The CBD responded by filing a "notice of intent to sue" over the Service's failure to publish a petition finding.

In a subsequent settlement agreement, the Service agreed to submit petition findings on the American Pika in 2009/2010. The findings of the Service's review—summarized in a Feb 2010 press release—deemed that Endangered Species Act protection for the pika "is not warranted." In their statement, Steve Guertin—the Director of the Mountain-Prairie Region—said:

> "We have completed an exhaustive review of the scientific information currently available regarding the status of the American pika and have analyzed the potential threats to the species. Based on this information, we have determined that the species as a whole will be able to survive despite increased temperatures in a majority of its range and is not in danger of extinction in the foreseeable future."

The statement also later concluded that:

> Based on the current information available, the Service finds that the magnitude and imminence of threats do not indicate the American pika is in danger of extinction or likely to become endangered within the foreseeable future throughout all or a significant portion of its range." (USFWS Press Release 2010)

Soon after the press release in February 2010, Patrick Reis summarized some of the controversy in a Scientific American write-up. He pointed, in part, to the Service's decision to decline to "consider the effects of warming after 2050, saying there was too much variability in the climate projections." This was in spite of data solicited from the National Oceanic and Atmospheric Administration (NOAA) that projected "western temperatures could increase by up to 5.4 degrees Fahrenheit by midcentury and by 10 degrees Fahrenheit by 2100" (Reis 2010). Shaye Wolf, biologist for the CBD, expressed her view that the Service underestimates the perils facing the animal and Greg Loarie, an attorney for Earthjustice, was quoted saying "to conclude the species is not even threatened by climate change is truly irresponsible."

The USFWS decision not to list the American Pika under the ESA was a loss for environmentalists and conservationists for a few reasons. First being that the Pika itself

would not be granted the considerable extra protections of the ESA or be granted the subsequent flexibility of possible actions that conservationists would be able to mobilize. Remembering that ESA protection deals not just with the material species itself, but also the multitude of factors that led to its decline. Shaye Wolf was speaking to the latter point when she said, "listing the Pika would have forced the Obama administration to take a hard look at climate change, and a very important part of that is bringing the Endangered Species Act too to fight against global warming" (Reis 2010). The Center for Biological Diversity had hoped that in petitioning for the listing of the American Pika under the ESA and citing Climate Change as the central contributing factor in the species' vulnerability, there would have been a precedent from which to pursue a chain reaction of environmental protections.

The Front Range Pika Project (FRPP), which would eventually expand beyond the Front Range into Rocky Mountain National Park and the White River National Forest, was created following the U.S. Fish and Wildlife decision. Describing their decision to launch the project the Pika Partners state,

> "In 2010, the U.S. Fish & Wildlife Service declined to list the American pika as threatened or endangered, citing uncertainty about whether the species was likely to be vulnerable to climate change across its entire range. Spurred on by this, Rocky Mountain Wild and Denver Zoo created the Front Range Pika Project to collect the long-term, large-scale data needed for conservation and management of pika and their alpine ecosystems under future climate change scenarios." (Pika Partners 2020)

This Colorado-based project, managed by local staff from a zoological institution's conservation wing and a conservation advocacy non-profit, was established in *direct* response to the USFWS' federal decision *not* to list. And that USFWS decision was initiated by a much larger national environmental advocacy organization's (CBD) strategic attempt to garner protections for the American Pika *and* create a legal precedent for greater

incorporation of future climate change scenarios into federal-level environmental and conservation calculus. That localized project, designed and facilitated by small core-group of scientists and conservation actors, eventually grew to include two other federal partners; the Forest Service and the National Park Service, as well as Colorado state parks divisions. Culminating in 10+ years of data collected by hundreds of trained 'citizen scientists' who spend their summers visiting high elevation pika habitat across the Colorado Rockies. This climate change and conservation research project, and the web of actors and participants that initiated and now enact it, are all wrapped up in a 'politics of listing.' A socio-environmental politic that traverses through adjacent environmentalist arenas (e.g. legal advocacy to field conservation) and across scales of participation (e.g. federal to public). The act of tracing this network of connectivity lays bare the socio-environmental priorities and scientific politics that underpin how contemporary conservation programming, like the Pika Project, come into being through the frictions of priorities and tensions surrounding questions of environmental futures. A politics of listing, wrought by a denial from one Federal Org (USFWS), can have the cascading effect of bringing other motivated federal partners to the table (e.g. National Park Service and Forest Service). An ultimately unsuccessful bid for listing protections initiated by a national scale environmental advocacy group (Center for Biological Diversity) can be picked up by local organizations with the means, skills, and priorities to design and execute programming that mobilizes large scale public participation towards conservation research goals. This web of social actors, current debates about of climate change futures, and the affected species and habitats are all imbricated in that politics of listing.

Figure 4.3 *Image of Colorado Pika. University of Colorado Boulder https://outreach.colorado.edu/program/front-range-pika-project/*

Striped Newt *(Notophthalmus perstriatus)*

The Central Florida Zoo's Orianne Center For Indigo Conservation, which specialized in the conservation oriented breeding of the Eastern Indigo Snake, also has a secondary conservation project that is also housed at the OCIC campus. The OCIC team is involved in a program to breed the Striped Newt (*Notophthalmus perstriatus*) in captive settings and reintroduce these amphibians into native Florida habitats. Much like the Indigo Reintroduction program, the OCIC acts as a node within the network of this larger project; with their specific role being the breeding and raising of animals for release. The project partners include the Jacksonville Zoo (also breeding/rearing), Florida Fish and Wildlife, US Forest Service, a number of environmental organizations that are part of the broader Striped Newt Working Group, and The Coastal Plains Institute that founded the repatriation effort.

The Striped Newt Repatriation project was established to intervene in observed regional declines in newt populations, and partially in response to the 2008 U.S. Fish and Wildlife Service's decision regarding the "Petition to List" the Striped Newt under the Endangered Species Act, which was filed by The Coastal Plains Institutes' founder and then president, Dr. Bruce Means. According to the Institute, the USFWS ruled in 2008 that "listing was warranted," but the species had received just an 8 out of 12 on the Service's priority ranking scale. As such, the striped newt would join the backlog of species awaiting the Service's final decision (Coastal Plains Institute 2020). Just one month before my arrival at the OCIC in Jan 2019, the USFWS released its final decision *not* to list the Striped Newt under the Endangered Species Act. Stating in the December 19, 2018 report that "after thorough review of the best available scientific and commercial information, we find that it is not warranted at this time to list [the striped newt]" (Federal Register 2018).

The Striped Newt Repatriation effort is concentrated in the ephemeral wetlands of the Apalachicola National Forest in the Florida Panhandle. Apalachicola is the largest National Forest in the state of Florida and encompasses 632,890 acres (988.89 sq mi) of land (Forest Service ANF 2020). The Striped Newt, like other salamander species, has a complex life cycle. However, it is important to know that adult newts utilize ephemeral—or impermanent—wetlands as their sole site for breeding and laying of their eggs. The Coastal Plains Institute describes how they were successfully sampling newts in breeding wetlands 50% of the time in the 1990's. Yet, by the early 2000's the striped newt populations within the National Forest had "declined to undetectable levels." By 2011, it had been 13 years since a 'larval stage' striped newt had been seen in the nearly 1,000 square miles of forest (Coastal Plains Institute 2020). This observed decline and the

decision by the US Fish and Wildlife Service to withhold—and eventually decline—listing of the species "instigated [the] coordination with the US Forest Service to create a self-sustaining population in the [Apalachicola National Forest] – to bring the striped newt back to an area which once harbored one of the largest populations in the world" (Ibid.). The project now includes organizations, multiple state and federal agencies, and zoological institutions—including the CFZ's OCIC. Arguably the USFWS' deferment, and eventual denial, to list the Striped Newt under the ESA and open up additional paths and resources for its conservation, is what led to the establishment of the coalition of partners involved in the Striped Newt Working Group and the repatriation efforts.

Figure 4.4 *(Left) Adult Striped Newts initiating amplexus; (Right) Director Michelle Hoffman and staff member in Newt Lab*

At one point during a conversation with one of the program directors with whom I worked, we got on the subject of the challenges and real-world implications that surround the issue of species' 'vulnerability'. Beyond the bio-physical realities of a species' declining populations and developing strategies to intervene in those declines, she described how she understands the "*perception*" of species' threats and vulnerability, on the part of the public and other stakeholders (e.g. agencies and grant funders), to be heavily

influential in mobilizing support for conservation efforts (e.g. financial, infrastructural etc.). But for her, those perceptions are often misguided and result in limiting proactive conservation efforts, restricting conservationists to challenging reactive positions. During that conversation she told me how,

> "It almost feels like by using the word 'threatened' you are almost…fucking them. Like, they don't need protection because they aren't 'endangered' yet.
>
> I almost hate using that term, because then people think they don't need help.
>
> We need to focus on [other classifications of threat]. Rather than waiting until they are critically endangered and there are too few in the wild. By then, it is too late. Or at least, we have waited too long.
>
> We need to focus on these species *now* [original emphasis]. Those species also need human intervention before they decline too far."

The significant commonalities between the Pika and Striped Newt examples, are the ways in which a coalition of partners have come together around a shared concern for their conservation into the future; especially in the face of their failed petitions for listing under the federal Endangered Species Act (even when conservation professionals believed those listing were warranted). The Front Range Pika Project's focus on Pika research and the Striped Newt breeding and repatriation efforts are examples of "*focusing on these species now*" rather than "*waiting until they are critically endangered*". The influence of the ESA within the U.S. conservation landscape is significant and it affords considerable protections to those species that are granted its designations. However, for many conservationists the pitfalls of the 'politics of vulnerability' associated with 'listing' that are embedded within the ESA, are such that by the time a species' overall population has declined to such an obvious degree to be granted listing, they have already "*waited too long*". With the influence of this recognition, and the consistent looming context of large

scale biodiversity declines, conservation professionals are engaged in efforts to navigate these realities and to identify alternative paths forward. In these examples, those alternative paths are paved by knitting together coalitions of organizations, state agencies, federal agencies (beyond the USFWS), and the wider public; collectively engaged in environmental action and "*human intervention[s] before they decline too far.*"

Lumpers and Splitters: Taxonomic Politics and Conservation Implications

In the Encyclopedia Britannica, Professor of Zoology A.J. Cain describes taxonomy in the following language:

> Taxonomy, in a broad sense the science of classification, but more strictly the classification of living and extinct organisms—i.e., biological classification. The term is derived from the Greek taxis ("arrangement") and nomos ("law"). Taxonomy is, therefore, the methodology and principles of systematic botany and zoology and sets up arrangements of the kinds of plants and animals in hierarchies of superior and subordinate groups. Among biologists the Linnaean system of binomial nomenclature, created by Swedish naturalist Carolus Linnaeus in the 1750s, is internationally accepted (Cain 2020).

Thus, taxonomy and taxonomic classifications are the underpinning logic and organization for how scientists think about organisms and organismal relationships; including fields such as phylogenetics, cladistics, and systematics. At the level of animal classification, there are no hard and fast rules for precisely what demands classification and reclassification within the taxonomic hierarchy—many scientists, historically and contemporarily, make their primary contributions within this field of classification. As Cain states, "It cannot be too strongly emphasized that there are no explicit taxonomic characters that define a phylum, class, order, or other rank" (ibid.). At the species level, the organismal population level characteristics used to classify a species vary based on a multitude of factors; including the preferences of the specific scientist(s) doing the work. For example, since the development of genetic material based analysis (e.g. DNA, mDNA,

rDNA) there has been a movement within taxonomy to prioritize genetic evidence as superior in classification decisions. Other characteristics for living organism classifications can include phenotype, morphology, biogeography, behavior, and molecular characteristics.

The above are related to what are referred to as "species concepts"; or the set of parameters that organize a group of organisms together into a 'species' category. At present, there are approximately 26 different ways to define a 'species'. This diffuse definition of what constitutes a species-group leads to what biologists refer to as the "species problem"—especially in contexts where numerous 'species concepts' can be applied to one group of organisms (e.g. typological (morphology) concept vs biological (reproductive) concept) and where those concepts may yield different arguments for categorization.

When researching and classifying extinct species, the implications of reclassifications are potentially an exercise in staying up-to-date on the most recent reconfiguration of taxa. However, when reclassifications are proposed in the context of species of conservation interest, the implications are more significant. It is another such case of "dueling PhDs" where the outcomes can have very material effects on ongoing species recovery efforts.

In the fall of 2018, after returning from Chicago and the International Union for Conservation of Nature's Wildlife Reintroduction Conference, I was emailing and organizing my upcoming research schedule with Michelle Hoffman, Director of the Central Florida Zoo's Orianne Center for Indigo Conservation (CFZ OCIC). Eventually it was settled that I would spend the spring of 2019 working with the Michelle and the staff of the

OCIC at their facility nestled in Florida's Seminole State Forest; named for Florida's most prominent indigenous tribe. The OCIC is a dedicated conservation breeding facility for the Eastern Indigo Snake (*Drymarchon couperi*); the only one of its kind currently operating. The taxonomic genus Drymarchon—commonly referred to as Indigos or Cribos—is comprised of large non-venomous colubrid species that are found in South America, Central America, and the Southeastern United States. The two Drymarchon species found in the United States—*D. melanurus erebennus*[34] (Cope 1860) and *D. couperi* (Holbrook 1842)—represent the most northerly examples of the entire genus.

When I arrived in the 2019, the OCIC and its conservation partners affiliated with the Indigo Reintroduction program were in the midst of a taxonomic dispute over the possibility of a reclassification of *D. couperi* into two species; *D. couperi* and *D. kolpobasileus*. This reclassification had been proposed in July of 2016 by Krysko et.al. in their paper '*A Cryptic New Species of Indigo Snake'* published in Zootaxa. When I arrived in early 2019, the co-authors of a counter-study—of which the OCIC's Director Michelle is one—were in the midst of seeking a journal to publish the findings of their response paper.

In the 2016 publication, Dr. Kenneth Krysko, of the Flordia Museum of Natural history, and his co-authors argued for the delimiting of the Eastern Indigo (*D. couperi)* into two species. The U.S. Drymarchon species had been previously designated as separate species by herpetologist Joseph Collins in 1991—establishing the Western Indigo Snake (*D. melanurus erebennus*) and Eastern Indigo Snake (*D. couperi*). This 1991 reclassification was done based on allopatry (geographic distribution) and morphological

[34] *Drymarchon melanurus erebennus* (AKA the Texas Indigo) is classified as a sub-species of D. melanurus, which is found in regions further south.

differences (the form and structure of an organism). Establishing that they are "building on [Collins'] hypothesis", Krysko et.al. proposed a "molecular" and "morphological" justification for splitting the species; establishing *D. kolpobasileus* as a separately occurring species along the Gulf coast of Florida and Mississippi. Ultimately they argue:

> "The new species is distinguished from *D. couperi* by a suite of morphological features, including a shorter and shallower head, deeper and shorter 7th infralabial scales, and shorter temporal scales. Overall, the presence of a deep 7th infralabial scale provides the best univariate identifier of *D. kolpobasileus* sp." (ibid.)

In short, their new species is best identified by a short head and the presence of a particular infralabial—or lower lip—scale. From these morphological features they argue for a taxa reorganization, and from that reorganization springs numerous material conservation implications.

Figure 4.5 *Image of proposed 'D. Kolpobasileus'. Photo by K. Krysko*
https://www.floridamuseum.ufl.edu/science/newly-discovered-snake-species-could-aid-conservation-efforts/

Earlier in my field work before arriving at the OCIC, I was sitting down during an interview with an early-career conservationist when the subject of taxa reclassifications came up. She sort-of scoffed a bit before describing how, in her view, so many of those

"*taxonomy guys*" had "*made their names*" and "*racked up*" their publication lists from establishing new species. Referring to them as "splitters"—which is a common term for scientists that err on the side of greater species delimitation, in the name of taxonomic 'specificity'—she talked about how she felt that many of them were constantly searching for any phenotypic or morphological feature in a population that they could then use as justification for a new species split and resulting publication. According to her, this was extremely common in the 1970's-1990's, with "*taxonomy guys*" trying to rack up the highest number of new species/sub-species attributions/descriptions to their names. She outright laughed when telling me how with the increased prevalence of genomic sequencing and genetic data analysis in the 1990's and early 2000's a lot of the "*taxonomy guys*" saw many of their species-splits "lumped" back together, when the genetic variations between species was deemed insufficient to justify them.

The scientific politics around species delimitation goes beyond any 'apolitical' taxonomic science or the bolstering of scientific credentials, when the delimitation is undertaken in the broader context of species declines and related conservation activities. Since the establishment of the Indigo Reintroduction Program, the relevant partners have introduced captively bred animals into two primary sites: Conecuh National Forest in southern Alabama and more recently into Apalachicola Bluffs and Ravines Preserve in the Florida Panhandle. Due to its overall population-level decline, the Eastern Indigo Snake (*D. couperi*) was federally listed as "Threatened" under the Endangered Species Act (ESA) in 1978; citing habitat threats, collection for the pet-trade, and gassing[35] while in gopher

[35] "Gassing" refers to the highly destructive regional practice of injecting gasoline/petrol into Gopher Tortoise burrows in order to force out/capture/kill rattlesnakes that may be using the burrows. See: 'Rattle Snake Roundups' for more information.

tortoise burrows. As with other ESA listings, the federal designation and corresponding protections supersede the state-level designations; however *D. couperi* is additionally classified as "Imperiled" and "Rare" in Florida (Florida Fish and Wildlife Conservation Commission 2020) and as "Endangered/Possibly Extirpated" in Alabama (Alabama Department of Conservation and Natural Resources 2020). Importantly, all of these classifications as well as the corresponding legal protections and conservation funds are attributed exclusively to *D. couperi* (AKA The Eastern Indigo); these would not extend to a possible *D. kolpobasileus* (AKA Gulf Coast Indigo Snake).

However, as conservationists involved with the reintroduction program explained to me, if the findings of Kenneth Krysko and his co-authors were to become widely accepted and established within the broader scientific ecosystem, there would likely be significant impacts to the material activities of the OCIC and the wider Indigo Reintroduction Program. Both of the current release locations fall within the proposed geographic distribution area of *D. kolpobasileus* and as such, the network of program participants would have been forced to reevaluate their approach and reassess the animals that have been reintroduced and those destined for reintroduction.

The response study to Krysko et.al. and the resulting publication were submitted in October 2018 and published in March 2019, during my time working at the OCIC. I remember the day when the paper was accepted for publication—Michelle was thrilled when she shared the news with the OCIC staff. Importantly, the acceptance of this publication occurred prior to the planned release of the 2019 cohort of Indigos into Conecuh National Forest and the Apalachicola Bluffs and Ravines Preserve. In their study, the 2019 authors reject the "two species hypothesis" based on their findings that:

> …patterns of population genetic and phylogenetic structure revealed substantial differences from the phylogenetic structure used to generate the two-species hypothesis.

And,

> …our separate analyses of mitochondrial and nuclear gene sequencing data failed to support this [two-species] hypothesis.

The authors also directly addressed the practical conservation implications of their findings when describing how,

> …because *D. couperi* is federally-protected as Threatened under the Endangered Species Act, efforts to conserve and recover the species can again operate under the hypothesis that *D. couperi* is a single species.
>
> … *D. couperi* is now being repatriated to Conecuh National Forest, Alabama, and Apalachicola Bluffs and Ravines Preserve, Florida. Genetic stock from southeastern Georgia is primarily being used for these efforts… Our evaluation of population genetic structure indicates that no error of releasing the wrong historical entity (i.e., species) to repatriation sites is being made, as was argued by Krysko et al.

In their concluding statement, the authors ultimately suggested that,

> …reviewers be particularly critical of species descriptions lacking analysis of population admixture and gene flow, because of the high costs of erroneous diversity on the conservation of imperiled biodiversity.

It is the final element of this concluding statement that was so prevalent in the minds of the Reintroduction Program partners during my time at the Orianne Center. Kenneth Krysko and his co-authors, in their argument that the "wrong historical entity" had been repatriated into Conecuh and Apalachicola, were set up to potentially invalidate over a decade's worth of Indigo conservation recovery efforts in the southeast. This conflict, in the context of species recovery conservation efforts, highlights the material implications of scientific politics within the conservation arena. Echoed by in the rebuttal of the 'two species hypothesis' which points directly to the "higher stakes" associated with this kind of

taxonomic publication when there are real-world activities ongoing regarding species of conservation concern.

When I asked Michelle, the OCIC Director, prior to the rebuttal study publication about how the Indigo Reintroduction partners were handling the 2016 publication of the "two-species hypothesis", her response was that 'even if the broad consensus in the Indigo conservation community was that a split in the Eastern Indigo species would likely not hold up under scrutiny, they were still bound by the expectations of scientific standards'. At one point saying, *"…it was peer reviewed and published. So you* have [original emphasis] *to accept it as the 'newest science' until something new comes out."* This instance of friction has numerous entanglements to unpack, but a feature of particular interest is that this clash is the result of two distinct scientific lineages—with their incumbent values and priorities—coming into conflict with each other. Taxonomy, as a field, has an historical lineage in which the shuffling and (re)classification of species—justified via any of the 26 different species concepts—is standard practice; one that is very often occupied in the realms of academic science. Yet, the "two species hypothesis" case example became a conflict of scientific politics explicitly because the embedded standards of academic taxonomy encountered the applied activities of conservation biology. When contending with extant species whose populations are not threatened and are not the subject of ongoing recovery activities, the often years-long practice of taxonomic classifications—in which taxonomists produce competing studies to either lump or split a species—is one that lives primarily on the pages of academic journals. Yet, when these activities spill over into spaces of field conservation, a reclassification could halt, alter, or dismantle years of applied work to conserve vulnerable species. Unlike academic taxonomy, applied

conservation biology is interconnected with vulnerable species, habitats, organizational partnerships, program finances, as well as state and federal support and politics. These are the "higher stakes" cited by the rebuttal study that could produce cascading implications for conservation professionals and active programs. However, even in the midst of a clash like that of *D. couperi* vs. *D. kolpobasileus*, in which the Eastern Indigo conservation program partners are confident that the species split will not hold up, they still felt bound by the wider expectations of 'science' in which the newest findings must stand, until alternative findings are produced and published. Placing this conservation program—and all of its interconnections—into a conflicting politics of science in which their activities are destabilized from one direction—even from a questionable study—but the standards of scientific practice in which they all operate demand they remain accountable to the newest findings, until formally rebutted[36].

Politics of Science and Conservation Realities

The challenges associated with each of these case-examples highlights the significant influence of scientific politics in the formation of conservation activities. In contrast to the too often monolithic or unified image of conservation presented in much anthropological analyses, through the prism of clashes of scientific politics we are better able to see the confluence of diverse actors, motivations, and outcomes involved—which provide a more contextualized understanding of lived conservation realities.

The conflicting politics of 'native-ness' that surround the North American Mountain Goat (*Oreamnos americanus*) within the ecological habitats of the Colorado

[36] As of 2021, following the publication of the rebuttal study in 2019, the Eastern Indigo Reintroduction Program has continued to release *D. couperi* into Conecuh National Forest and Apalachicola Bluffs and Ravines Preserve. (See: Chapter 3).

Rocky Mountains is an ongoing, decades-long convergence of misaligned environmental politics. As a result of the these conflicting positions on the species' contested 'native' status by different influential environmental actors who are charged with management of the literal landscape of Colorado (Colorado Parks and Wildlife V. National Parks Service), a 'patchwork conservation landscape' has been produced. This scientific politics derived patchwork functionally means that the 'status' of *Oreamnos americanus*—and how the species is treated by land managers—changes based on what political barriers individual animals may cross in their movements across the mountain landscape.

In the United States, the federal Endangered Species Act (ESA) is positioned as the flagship conservation legislation, under which successful species 'petitions for listing' as 'threatened' or 'endangered' grants sweeping state-sponsored protections for those species. As a result, listing under the ESA is a coveted status by conservation actors who are invested in the preservation of species and habitats across the U.S., especially in the wider context of environmental change. However, while the successful listing of a species under the ESA initiates an established—'top-down' federalized—framework of protections, research, and conservation actions on that species' behalf, this discussion offered a window into the aftermath of *failed* petitions for listing. The Front Range Pika Project in Colorado and the Striped Newt Repatriation Project in Florida are examples of how the 'politics of listing' in the U.S. influences the formation of conservation actions. The partnerships and program activities of these two projects were created in *direct* response to the decisions of the U.S. Fish and Wildlife Service not to grant these species ESA status. In the face of climate change's localized impacts on habitats and wildlife, it was the absence of ESA listing protections that brought together committed networks of conservation actors (e.g.

private orgs & zoos, state and (other) federal agencies, and the lay public) to form novel conservation arrangements to address the current and future statuses of these vulnerable species. Ultimately, challenges and constraints associated with the politics of *failed* petitions for listing influenced the creation of these prominent conservation activities.

The 'two species hypothesis' proposal of 2016, which sought to 'split' the Eastern Indigo Snake species (*Drymarchon couperi*) in two, was an example of the politics of science associated with a convergence of two sets of misaligned scientific priorities. Taxonomists, carried by the standards of their discipline, leveraged a particular 'species concept' in order to declare the existence of 'cryptic species' of Indigo snake in the Gulf Coast region of the U.S.. This proposed species split carried with it the existing politics of the 'species problem' within the field of taxonomy as it converged with the ongoing recovery efforts (captive breeding and reintroductions) of the Eastern Indigo by the E.I.S. Reintroduction Project. Proponents of the 'species split' used their taxonomic reclassification proposal to claim the "wrong historic entity" was being released by the Reintroduction Project partners—a claim that could have jeopardized over a decade of species recovery efforts. The 2019 rebuttal study and publication not only refuted the scientific interpretation behind the species split—as would be expected—but less expected, the authors also called on reviewers of such proposals to more rigorously interrogate future taxonomic reclassification studies; most especially when they address species that the subject of ongoing recovery efforts. In the context of environmental change and conservation activities to address its cascading effects on species and habitats, these conservationists called for an explicit recognition of the "higher stakes" associated with

injecting the scientific politics of the 'species problem' into the realm of applied conservation efforts, with all of its exiting interconnecting environmental politics.

Witnessing these dynamic politics of science impact the professionals with whom I worked and shape their conservation activities was an opportunity to observe their significant influences first hand. In the span of one week's time I worked with conservation professionals as we crossed the boundaries of the Mountain Goat's 'patchwork' conservation landscape in the Colorado Rockies. I assisted in site surveys and data collection on an expansion of the Front Range Pika Project (FRPP) onto Forest Service and National Park Service lands, because those federal agencies saw the vulnerability of Pika and sought out the FRPP partners to become involved, even when the Fish and Wildlife Service did not. I was sitting in a Working Group meeting on Central Florida Zoo's campus while a U.S. Fish and Wildlife Service representative told the assembled members why the Service had chosen not to list the Striped Newt under the ESA. And I was working alongside the OCIC's Director when she was answering questions from outside scientists about *D. Kolpobasileus* in the spring of 2019 as the Indigo Reintroduction partners were negotiating what the species split hypothesis might mean for the future of the conservation project. Understanding the challenges, frictions, and complicated realities that shape the formations of contemporary conservation necessarily entails attending to the influences of negotiating the internal politics of science within conservation itself—and investigating these negotiations requires treatment of conservation, not as a monolith, but as constellations of species, habitats, landscapes, and diverse human actors coming together in particular formations.

Chapter 5: Contextual Realities of Conservation(ists)

In the introduction to their 2018 volume, Larsen and Brockington establish the following call for future relationships between anthropological examinations and conservation organizations: "The real interest involves contributing to a more multifaceted understanding of NGOs, their forms of action and the contextual realities within which they operate. [They ask] How is it possible to represent what conservation NGOs are and what they do if we acknowledge that they are dynamic and made up of webs of relations and networks rather than monolithic entities?" (2018:2).

While this statement and the other works within the volume are explicit in their focus on transnational conservation NGOs, I still found their thinking to provide a productive analytical design for examining the people, programs, and organizations who were the focus of this research. During my fieldwork it became overwhelmingly clear how influential 'webs of relations and networks' were in shaping the contours of conservation actions. Very little conservation programming or activities operate without relational webs that are comprised of individual professionals, partner organizations, governmental bodies and agencies, and a diversity of other social groups or publics.

Through the nexus of the Rio Mora National Wildlife Refuge in New Mexico, the protected area at the center of this case example of contemporary conservation action in the U.S., this chapter examines to how 'webs of relations'—and all of their incumbent challenges, influences, and opportunities—shape conservation action. Rio Mora NWR is a novel example, across multiple axes within the conservation landscape of the United States. The zoo-adjacent environmental professionals who were engaged in the day-to-day

management of this conservation model during my fieldwork, were participating in enacting a vision for conservation activities that endeavors to extend the boundaries of conservation participation. An act of extension beyond professionals and protected areas (PA), that is in direct recognition of the limitations of continued reliance upon PA's in the face of ongoing environmental change and landscape scale ecosystem challenges. Additionally, this examination of the professionals, partners, conservation philosophy and practices offers insight into a model for future directions of zoological institution activities. This chapter draws upon the experiences, perspectives, and motivations of Rio Mora's small team of professionals in order to construct an understanding of their conservation activities that is humanized through their stories, challenges, decision-making, successes and visions for the future.

Figure 5.1 *Bison grazing at Rio Mora Refuge.*
Image obtained from Wind River Ranch Foundation.

RIO MORA NATIONAL WILDLIFE REFUGE

The Rio Mora National Wildlife Refuge is a 4,224 acre conservation area in northeastern New Mexico—situated in the transition zone between the Great Plains and

the Southern Rocky Mountain eco-zones. The refuge is part of an ongoing project to protect and restore the Mora River Watershed and the surrounding Great Prairie Grasslands. Along with the 2012 establishment of the Sangre de Cristo Conservation Area in southern Colorado, the Rio Mora NWR forms a 'wildlife corridor' in this ecological transition zone (USFWS), linking the Plains and the mountains.

The Rio Mora Watershed, of which the National Wildlife Refuge is one part, extends over 952,000 acres; the conservation area is primarily comprised of Shortgrass Prairie landscapes interspersed with Piñon-Juniper and Ponderosa Pine Woodland habitats.

Prairies once formed the North American continent's largest continuous ecosystem, historically covering 170 million acres—stretching from the Rocky Mountains to east of the Mississippi River and from Saskatchewan, south to Texas (NPS Prairies 2020). Unlike the more common Tall and Mixed Grass Prairie found closer to the Mississippi River Basin, the Short-Grass Prairie biome is semi-arid and receives significantly less precipitation—making the biome reliant upon the functional health of the Rio Mora River Watershed area. Approximately 96% of pre-European-settlement grasslands have disappeared, and as a result, the Shortgrass biome found within the Rio Mora NWR is an example of one of the most endangered ecosystems in the world (Denver Zoo Rio Mora 2020).

The Rio Mora National Wildlife Refuge is located in Mora County on land that prior to Mexico's 1835 Mora Land Grant—as part of the encouraged settlement of *Territorio de Nuevo Mexico*—was historically used by Apache, Pueblo, Navajo, Ute, and Comanche indigenous groups. In the 19th and 20th centuries the land was dominated by cattle ranchers. The 4, 224 acres of land was purchased in the 1980's by philanthropists

Eugene and Clare Thaw. The Thaw family created Wind River Ranch—transitioning the land to a horse ranch—while from the very beginning having intentions of restoring and preserving the land as part of a larger project to restore and protect the "ecological heritage" of the southwest (Wind River Ranch 2020).

Eugene and Clare Thaw formed the Wind River Ranch Foundation in 2005 to "create a center for ecological restoration, research, education of youth, and a place where the great minds of conservation could come together to create solutions to counter degrading ecological systems" (ibid.). In 2005, Dr. Brian Miller, formerly of the Denver Zoo, was hired on to serve in the position of Founding Scientist and Executive Director for the Wind River Ranch Foundation. It was under Brian's tenure that the Apache, and later the Pueblo of Pojoaque, became involved at Rio Mora and the reintroduced bison herd—more about this later.

In 2012, the Thaw family made the decision to donate Wind River to the United States Fish and Wildlife Service (USFWS) to become the Rio Mora National Wildlife Refuge as part of the USFWS's larger Northern New Mexico National Wildlife Refuge System. At the time of the land donation the USFWS had insufficient resources to manage the Refuge. Subsequently, the Thaw family contributed the operational budget to the Denver Zoological Foundation; facilitating the inclusion of the Denver Zoo and its role in staffing and managing the refuge on *behalf* of the USFWS. In addition to the Denver Zoo and the USFWS, Rio Mora NWR's mission is currently undertaken by two additional partners: the Pueblo of Pojoaque tribe and New Mexico Highlands University.

Rio Mora National Wildlife Refuge is reportedly the only refuge of its kind in United States (Denver Zoo Rio Mora 2020). Upon the transformation of Wind River Range

into Rio Mora NWR in 2012, the newly formed refuge and conservation area was—from its origination—established as a multi-organization partnership. Observable on the image included below, Rio Mora is jointly managed by the four founding organizational partners: the Denver Zoological Foundation (Denver Zoo), U.S. Fish and Wildlife Service, the Pueblo of Pojoaque, and New Mexico Highlands University. Rio Mora's partnership dynamics are outlined in a unique Memorandum of Understanding (MOU) signed by all parties. In a general sense, Denver Zoo staff located in New Mexico are tasked with the daily operational management, while the USFWS provides infrastructural support (e.g. heavy machinery for land works projects), assists with education programs etc.. The Pueblo of Pojoaque are in charge of managing the reintroduced American Bison herd, and Highlands university is tasked with education, research, and community programming along with U.S. Fish and Denver Zoo staff.

Figure 5.2 *The Refuge's sign at the main gate; list of partners along the bottom. Image taken by author.*

Established as a site of "ecological and cultural restoration" [interview with Brian Miller summer 2018] , Rio Mora "serves as a model…for the development of innovated grassland restoration techniques, ecological and cultural bison restoration, community engagement and environmental education, collaborative partnership building" and conservation management strategies that have the potential to stretch "across the Rocky Mountain Shortgrass prairie interface of New Mexico and Colorado" (ibid.).

Practicalities of Accessing Rio Mora

Visiting the staff at Rio Mora during my fieldwork was an opportunity to observe and conduct interviews about a conservation framework that is currently unique on the conservation landscape within the United States. While I was only given a short time to visit, explore, and conduct in-person interviews, I ultimately felt it was worth navigating the practical research limitations in order to see this novel conservation model, and gather the stories and experiences of how it came to be from some of the people pivotal to its creation and its ongoing operations. While the majority of the ethnographic data used in this chapter were collected with Denver Zoo FCON staff (both in New Mexico and Colorado), I did have the opportunity to very briefly interact with USFWS staff and some of the university partners. However, one important limitation is the absence of any direct interactions with members the Pueblo of Pojoaque. The Pueblo of Pojoaque predominantly live a few hours north of the refuge and unfortunately none of the bison managers were present during my visit. As such, while their role is significant and included in this chapter's discussion, it is limited by nature of being one-sided from the perspective of the refuge's conservationists.

ARRIVAL AT THE REFUGE

I left Lexington, Kentucky to drive to Denver, Colorado in the summer of 2018. I would spend part of that summer with the Denver Zoo's Field Conservation Department and part of it with the conservation-adjacent staff at The Butterfly Pavilion, north of Denver. The morning of my first day on "on-campus" at the Denver Zoo's main facilities inside of Denver's City Park, I had an initial sit-down meeting with Dr. Graeme Patterson. Graeme was the Zoo's Vice President of Conservation and Research, and the head of the Field Conservation Department. During that first period with the FCON department in 2018 I was labeled as a "shadow", meaning I was more-or-less supposed to be attached to Graeme. Which meant having considerable access to him and his daily schedule. However, in our first meeting in his office where Graeme spent time giving me the breakdown of the department, its staff, missions, and activities, he asked if I was interested in visiting their Rio Mora program. At the time I was as familiar with the program as one could be when relying on what was available from basic internet searches. But of course I answered in the affirmative; I would love to visit the refuge, see the work being done, and have an opportunity to interview the staff. Graeme called in Erica Garroutte, the Field Conservation Community Engagement Manager, to ask if she would help me set up logistics and give the refuge staff a heads up.

So, just a few days after driving across five states from Kentucky to Colorado, I was packing up my car once again and heading 6 hours south on I-25 to New Mexico. I remember spending the entire drive craning my head around to maintain clear views of all of the constantly new landscapes. I remember at one point, still in the plains of southern Colorado, I saw a school bus drop off children at their bus-stop at an empty cross-roads.

The landscape was so dry and flat in the summer heat that you could see unobstructed for what seemed like miles. It was a landscape I had only seen in pictures or movies, and I still wonder how far those kids had to walk before they arrived home.

The landscape began to transition soon after I crossed over the border into New Mexico and drove further into its interior. I would learn later that week during an interview at the refuge, that the transitions from brown scrub to muted green prairie dotted with Pronghorn Antelope (*Antilocapra americana*)—this was my first sighting of Pronghorn—was actually my observing the transition into the Short Grass Prairie biome of the Rio Mora Watershed. My un-initiated eyes were picking up on some of the characteristics of the ecosystem that the refuge and its staff were established to protect.

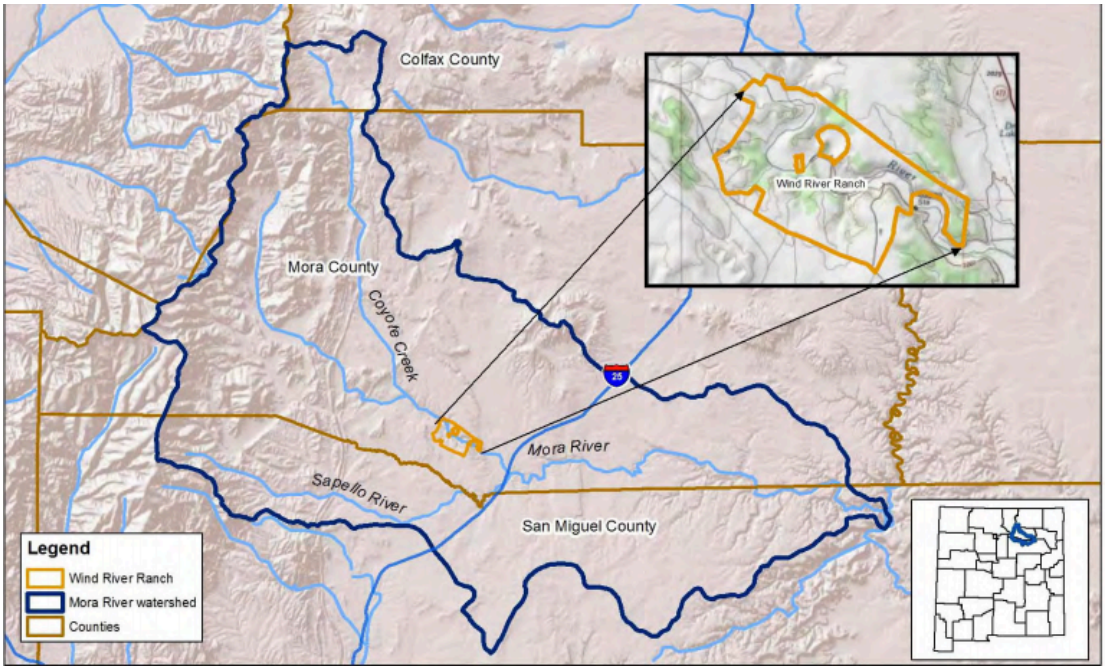

Figure 5.3 *Map Showing the original Wind River Ranch situated in the middle of the Mora River watershed and within the state of New Mexico. Map from USFWS' 2012 Environmental Assessment.*
https://www.fws.gov/southwest/Refuges/Plan/docs/NewMexico/Rio_Mora_NWR_EA_Final_June_2012.pdf

After a couple of wrong turns on the rural back highways of northeastern New Mexico, I arrived at white gates of the refuge. Following the unlocking procedures that

Erica had provided, I unlocked-pulled through-and relocked the refuge's gate behind me; the refuge is not open to the public and has a complete perimeter fence and cattle grates to keep the bison herd on the refuge and off of the neighboring cattle ranches. Once again following Erica's directions, I drove along the gravel refuge road (keeping an eye out for the bison herd—as Erica suggested) and made my way deeper into the property. Driving slowly I made my way past the corral system where the bison are herded for any up-close work and eventually came to a sloping downhill road that my directions said should take me into one of the refuge's canyons where the guest and researcher housing are located. Once more following the gate protocol—this time to keep the bison herd from making their way into the protected visitor/researcher areas—I made my way down into the canyon valley and pulled up to the front of the Thaw House. A classic New Mexican style ranch home—constructed from log and white-washed plaster—shaded by mature trees, that is named for the Thaw family who once lived there. I spent the evening catching up on field notes while sitting on the front porch that looks out over the small canyon pasture and the surrounding cliffs that rise above, encircling the canyon floor.

"Contemporary conservation requires out of the box thinking."

On the first morning of my visit I had a meeting scheduled with the Denver Zoo's Program Director of Rocky Mountain/Great Plains activities, Dr. Luis Ramirez. Luis is a grasslands ecologist by training and in his role with DZ FCON he was charged with overseeing all of the active conservation programming undertaken in the Rocky Mtn/Great Plains region(s), while also living in New Mexico and acting as the day-to-day site manager for the refuge. Our morning meeting was supposed to take place in the Refuge's administrative offices. So that morning I finished my coffee on the front porch while

watching the sun crest over the eastern ridge of the canyon walls, before jumping back in my car and driving up the canyon road towards the bison corrals that I passed on my way in, the afternoon before. Swinging left at the corrals, I followed the gravel road for another few minutes before reaching the Admin building—a converted residence that once served as the ranch-manager's residence, before the Refuge was established. I climbed the wooden stairs to gently open the front door—I was technically supposed to be there, but showing up at a new site is always an experience of uncertain trepidation. I stepped through the door and was greeted by a site that would become quite familiar during my field-research. The building was what you might kindly call a 'well-used' space. A space that was once a residential home with its worn carpets, 1980's-style oak kitchen with laminate counters, wood paneled walls, and dining table turned work space. To the left of the door, in what might once of have been a living room space, the couches were gone and the walls were lined with a series of desks that lay slightly buried underneath stacks of paper, binders, and notebooks, along with the random bits that shout "scientists work here": piles of rocks, skeletal remains of different animals, dried insect carcasses, and anything else that a staff member might have picked up out of interest over the years. All of this accumulates over time to provide these kinds of admin/research buildings with a very particular and very familiar aesthetic. This building also possessed a rather unique and powerful smell of Moth Balls that greets your senses as soon as you walk in. I would find out later that this smell leaks out of one of the converted bedrooms-turned-lab-storage down the hallway, where the Refuge's insect reference collection is stored and where moth balls are used to prevent living insect pests and fungal growth.

Seated at one of those desks lining the wall when I arrived was one of the Refuge's interns. An undergraduate college student who was working with Rio Mora staff as part of her university training. She was the first person in the offices that morning and I sat at the table next to the kitchen while we spoke for a few minutes, waiting for Luis to arrive. Dr. Ramirez arrived a few minutes later and after initial introductions and chatting, we were able to sit down for about an hour to talk about the refuge.

In starting off our interview, I asked him to provide a sort of 'identity overview' or breakdown explanation of the Refuge from his perspective. He opened with what he called the "*big picture*" and the relationship between the activities of the refuge and the Denver Zoo:

> "So where to start? Big picture, what we do here is landscape conservation. That is kind of unique for zoos, to work in this way—I am only aware of one or two more. And the way that I have to explain it is…the typical approach for Zoos is top to bottom. So they pick a species, for whatever reason… it is in danger or threatened, something…and they work from there down. Here—and that doesn't make it a bad approach…it is just a natural fit for zoos—the way that we approach here [sic] is…1) we are lucky we don't have any endangered species here…so, that gives us the opportunity to work the opposite…bottom up.
>
> So we work, technically, with habitats. We manage habitats. And how they are connected…the different types. So, if someone were to ask me what species do you work with…I would answer 'maybe like three or four hundred'. <chuckle>
>
> So that is quite unique for zoos.
>
> The other is that…even though we have bison here, we see bison as a restoration tool. We don't have bison because…of a species we want to save…or the genetics…many other organizations are doing that, we don't have to replicate [sic]. [Instead there is a focus on] how bison can impact the landscape to the benefit of other species."

In referencing the bison herd, Luis also briefly mentioned the partner relationship with the Pueblo of Pojoaque for the first time, *"Yeah, so that is from our side. Also, the*

bison has a huge [original emphasis] *value—for us as ecological restoration—for the Pojoaque…it is cultural restoration*." [37]

Returning to speaking about landscape-scale restoration and conservation activities, Luis explained how,

> "The refuge is only 4,200 acres. So, technically it's not even close to be enough to do anything [sic]. Whatever we do here is pretty much insignificant, in the bigger context. But because we work with landowners, and other stakeholders…that right there is where we make the difference.
>
> Restoration takes a long time. You restore grasslands and you will not see full results for 10 to 15 years. Even some of the oldest restorations in the world that are eighty or ninety years old in Europe, when they evaluate those, they are not even close to being done…"

Luis also explained how the restoration staff and partners approach their thinking about the role of Rio Mora and the work that they do, in relationship to the surrounding landscape and landowners. He described how in hypothetical circumstances without a site like Rio Mora, he would have tell a landowner interested in restoration what changes to implement and then tell them they would need to wait 50 years to see the results. But with Rio Mora in the equation, they are able to provide the expert advice to regional land owners/managers and *show* them the results at Rio Mora, to provide material context. Or in Luis' words,

> "So they can get on board…That is the huge value of this place as a demonstration site. So that is, that is the scale that we work. A place where we can test ideas. …Landowners cannot take the risk of testing something that is not proven. We [can] do it here. We can do a lot research and also we can use this place to develop capacity."

In concluding his "*snapshot*" of Rio Mora's activities and mission, Luis summarized the refuge by describing,

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[37] The role of the Pueblo of Pojoaque in the management of Rio Mora will be discussed in greater depth later on, but this was the initial mention of the tribe during my interviews with the refuge staff.

> "So that is kind of what we do. In general, we have several strategies. One being Ecological Restoration. Other is [sic] protected area management, conservation education, and capacity building. Capacity building includes working with those land owners so they can manage their land better. But also to help create the next generation of conservationists. So that kind of what we do, it's like a snapshot."

Rio Mora's Management Partnerships

I then asked Luis to describe the practical mechanisms for how the refuge operates—focusing on the partnership structure and how that functions—he described that,

> "How we work is…we have three main partners…or like four partners in this group. Two that take most of the load in terms of fieldwork and making things happen, and two more that uh…they contribute hugely to actually making it a reality.
>
> The two is [the] **Fish and Wildlife Service** and **Denver Zoo**. Fish and Wildlife Service own the land and contribute some funds to run it. Denver Zoo does pretty much all of the day-to-day management. **Pueblo Pojoaque** [sic] contribute with the bison herd…that is the center of most of the things we do here. And uh…**Highlands University**[38] is our main research partner. So, that is kind of like the way that we work. That is why we value, a lot, these kind of partnerships.

Luis described that within the operating structure of the multi-partner dynamic, the Denver Zoo staff who are responsible for the day-to-day refuge management, are able to be significantly more impactful secondary to their relationship with the Fish and Wildlife Service; even though USFW does not have the resources to directly manage the Refuge. One practical example that Luis offered was in explaining that much of the landscape restoration work at the Refuge requires heavy machinery, such as Bulldozers. Without the use of USFWS equipment, it could cost the Denver Zoo approximately $10,000 a week to rent one piece of equipment, or close to $500,000 to purchase it outright.

> Luis: "So, as a non-profit it would be very difficult for us to implement some of these restorations. But, it just so happens that Fish and Wildlife has a dozer…that is sitting for the moment…to the south. They bring it here… [and] we have the

[38] Highlands University in Las Vegas, New Mexico is the dedicated research partner for the refuge. Highlands is especially committed to serving its majority Latino and indigenous student population—with students heavily representing southwest populations and 19 different indigenous tribes.

operator. We work with our experts…we design the restoration…we implement it…and a month later, it is done."

Me: "[And all] without having to buy a dozer. <chuckle>"

Luis: "[And] without having to deal with all of the bureaucracy. Because [USFWS] cannot do some things, but they can do others. So we complement each other a lot. So that gives you an idea of how fast, and how efficient we can be when you have a good partnership."

Me: So if you were trying to get them to do the actual work?

Luis: It would take 7-10 months.

Luis: Denver zoo, on their own, it would take a year or a year and half. I have to find a grant…apply for a grant. All those things.

Me: Just to do four weeks of work...

Luis: <nodding> [But] with a few calls, we can make it happen in a couple of months. So that tells you how fast and how efficient we can be.

However, according to Luis this kind of partnership dynamic does not come without its challenges. The staff who work on site at Rio Mora have to adhere to two sets of organizational regulations and guidelines. Staff need federal defensive driving certifications to drive vehicles owned by USFWS or federal certifications to operate chainsaws and they have to maintain current Tuberculosis tests (requirement of all Zoo staff), even though they do not work on the Zoo's campus. Luis says, **"***In some areas you have to still find a way to work in between two bureaucracies*."

And yet, even amongst all of the organizational nuances and navigating the practical challenges that come with such a partnership dynamic, Luis pointed out that the structure of Rio Mora is completely novel in the U.S.; and that this kind of novelty requires "*flexibility*" and "*adaptability*" when working within a new model. He explained,

"As I say we can be very efficient, but we also have challenges of dealing with two very different approaches to problem-solving. But, we are very lucky that the team

> that got together with all of the partners have been very supportive and they believe in what we are doing. So, being able to be flexible and adaptable to what we are doing. Because it's a brand new concept. There are 560 something Refuges in the United States and this is the only one that is like this. It is the very first time that the Fish and Wildlife Service has taken the risk to partner with other organizations to manage protected areas...protected land."

Luis went on to emphasize his point about the role of and need for partnerships, not only in the specific case of Rio Mora but in the context of land conservation more broadly. He explained his perspective to me by saying,

> "[Like when I was telling you] that 4200 acres is not enough…that is just [one] example. [What] if I tell you Yellowstone is not big enough? That would give you an idea that the amount of land that we have to protect and manage is just huge. And the truth is the government cannot do it. They do not have the capacity or the resources to actually make it happen…non-profits will not make it…universities will not make it. So the only way is to work together. And that is the only way that we will be able to make it happen."

From Dr. Ramirez's stand point, the expanding challenges confronting contemporary conservation efforts requires "*out of the box*" thinking on the part of the organizations, agencies, and conservationists involved. Expanding further on his thinking about shifting conservation practices to achieve larger scale impacts, Luis broke down his ideas in this way,

> "For example, right here <gestures to indicate that he speaking about the region/landscape surrounding Rio Mora>. The ranch just north of us is 97,000 acres. The ranch south of us is 120,000 acres. So, if I engage with only about seven to eight landowners, I can make it from here to Colorado. So that tells you what it's like if you want to get to that scale of conservation, you have to work with land owners. And you have to get those out of the box thinking…Move away from Fortress conservation and [towards] more engagement with the community. It is how…it is the only way. With those eight landowners, we already impact more than Yellowstone. And you only have to convince eight people, or eight families. <Chuckles> So, that is kind of…what we acknowledge and recognize that we have to be doing…to make it happen."

Novel Partnerships: The Pueblo of Pojoaque

As was mentioned above, a significant aspect of how Rio Mora and its managing partners are shaping a "novel" approach to contemporary conservation work, is through the explicit incorporation of the Refuge's indigenous management partners; the Pueblo of Pojoaque. When discussing the tribe's role and relationship with the other Refuge partners, with the Bison herd, and with the regions around Rio Mora, Luis explained:

> "How Pojoaque plays into the picture is...One [it] is [because of] this part of New Mexico. These were the historical hunting grounds for the Pueblos. There is only one Pueblo...that is not that big...that is farther northeast from here. So, they were not very present in this whole region. But this was the closest area for them to access good numbers of prey. Bison—here we didn't have the huge 1 million animal herds like Nebraska or Oklahoma—but there were a few thousand. So they would come here…harvest…and take it back to the Pueblos.
>
> So this area was very important for them. But also for the Plains cultures...like the Apaches and others. And even here, inside the Refuge you can see that. You can see we have cliff dwellings and less than a quarter of a mile in one of the Canyons they're TeePee rings. So they both were interacting here. This was like No-Man's-Land, but everybody had use of it."

In this initial description of the characteristics of the partnership dynamics of the Pueblo of Pojoaque, Dr. Ramirez chose to emphasize a connection between the tribal partners and the regional landscape, of which the Refuge is a part. Reinforcing that there is not only a contemporary connection through this very recent multi-partner agreement, but that there is an historical connection between the Pueblo of Pojoaque and the landscapes of Rio Mora. That Luis chose to foreground this connection provides a window into some of the broader ethics of conservation practice that are being put into practice within this approach to landscape conservation work. This sensibility was echoed in other interviews I conducted with people involved with the Rio Mora project. There seemed to be a shared sense of 'right-ness' that the Pueblo of Pojoaque were present and active in this

management agreement; and it was a core aspect of the Refuge's identity and priorities that conservationists often foregrounded when speaking about it.

Figure 5. 4 *Image of Pojoaque' adult female American Bison and calves at Rio Mora. Image taken by author.*

The Influence of Individual Actors Shaping Conservation

When exploring the partnerships and activities that shape the contemporary form of the Rio Mora Wildlife Refuge as a unique conservation and restoration project in the U.S., everyone with whom I spoke—both in Colorado and New Mexico—were sure to quickly draw my attention to the influence of Dr. Brian Miller. When Luis was discussing some of the events that led to indigenous partners and the bison herd at Rio Mora, he said the following,

> Luis: The history of the bison…the start is very interesting. They came...it was [with] the [Jicarilla] Apache. They are in the other side...just north… But they came to this area looking for a place to be able to harvest some of the traditional plant[s].

> And they were looking around, they went to [the national monument][39] that is like five miles north from here. And [the monument] said, like 'no we cannot let you do that...this is federal land. But there is a ranch over there, that they would be totally open to it.' <chuckles> And this was when Brian was the manager [of Wind River Ranch]. So that was the very first connection with one of the tribes.
>
> Me: So the Apache came and actually harvested plants for ceremonies or medicinal purposes?
>
> Luis: Yeah…and that started the relationship. And then, I don't know how long... Brian can give you that information. The idea of Bison came. I am pretty sure that Brian had that idea before to bring it, but it was very real now. So they brought a small herd of bison.

As Dr. Ramirez said in that final quotation, the "*first connection with one of the tribes*" and ultimately the current role of the Pueblo of Pojoaque and the Bison herd on a federally owned Refuge—something that is happening nowhere else—could be traced to the priorities and relationships of the founding scientist and former Executive Director of Wind River Ranch, Dr. Brian Miller.

Prior to being hired by Eugene Thaw to manage Wind River Ranch, Dr. Miller was a conservation scientist with Denver Zoo's then Conservation Biology Department, originally hired by its former Director, Dr. Rich Reading—another conservationist interviewed for this project. In 2004, Eugene Thaw had tried to offer the ranch to the Wildlife Conservation Society (WCS)—a New York Based Conservation NGO[40]. Initially, the WCS asked Brian—at the time a Denver Zoo employee—to move to the ranch as their employee to begin conservation and community programming. But ultimately the Board of WCS rejected the offer by Thaw and decided not to take on the responsibility of Wind

[39] The Fort Union National Monument, managed by the National Park Service, is located north of the refuge in Mora County.

[40] This is the same organization that formerly employed two of Denver Zoo FCON staffers: Natalie Ingle (who has since returned to a position with them) and Dr. Graeme Patterson, the VP of FCON during my fieldwork.

River. As a result of the process, however, Eugene Thaw decided to hire Brian on his own to implement Brian's proposed ideas, forming the Wind River Ranch Foundation. This is really where the story of many of the elements of the contemporary USFWS' Rio Mora National Wildlife Refuge take their shape. This "novel" partnership approach to landscape scale conservation work is really rooted in the vision, priorities, and actions of Dr. Brian Miller (and the contributions of the Thaw Family)—a perspective that was reinforced to me numerous times by different members of staff.

Brian arrived at the Rio Mora offices while I was talking with Luis that morning—I learned later that the converted residence-turned-refuge office once belonged to him and his family when he was the Director of Wind River. When my interview with Dr. Ramirez concluded, we stood up from the table and he introduced me to Brian for the first time.

Brian is a tall, slender man in his early 70s. He wears glasses and his grey hair was cut short and tucked under a sun-bleached and well-worn baseball-style hat. Despite his height, his demeanor is gentle and relaxed, and his deep voice is clear while also soft—as though he is rarely in a rush to say anything. He shares certain physical characteristics that I have come to associate with other conservationists that clearly prefer a life in the field to one in an office or lab. His skin was deeply tanned, his hands were callused when reached to shake mine, his face was framed by wrinkles that likely developed from years of squinting in the sun, and he had the frame-carriage of someone that is ready to stoop down to more closely inspect a sign on the ground or an insect or plant that catches his eye, at a moment's notice. He would tell me later that, "*I always stayed in the field…I didn't want to do anything that would take me away from that.*"

After introductions, Brian finished up his conversation with the Rio Mora intern—who turned out to be his daughter—and clarified with Dr. Ramirez where he would be taking me on the Refuge. We headed back out of the front door and towards a pick-up truck parked on the side of the office that wasn't there when I arrived earlier in the morning. I put my day-bag in the passenger floor-board at my feet as we backed out of the shade where Brian had parked and headed back up the road towards the Bison corrals.

Brian and I chatted about his education, training, and past research as we drive. He earned his PhD working with Black Footed Ferret conservation in the U.S—research that eventually led to his spending a number of years working in Mexico, where he also conducted research on Jaguars and eventually met his wife—who is from the city of Toluca, he told me. He took us up a road that I had not previously noticed on my own drive in the day before; we approached the first locked gate and it quickly became my job to jump out of the truck with the keys to unlock and open the various gates along the way—all intended to manage the Bison herd's access to different sections of the Refuge. We were heading northward and gaining elevation when he tells me, "*we will go up on the north side first—get a nice overview of the whole place*." Calling the route we took to the north side a 'road' is potentially too generous of a term; at least by most people's definition. The track in some places was just wide enough for Brian's small four-wheel-drive pick-up, but we were bounced about as he has to expertly negotiated the ruts, rocks, and washout sections as we climbed higher and higher up the canyon ridge.

Brian stopped the truck up on the ridge and pointed to his left where the truck's driver-side window was framing the Refuge's cliffs—He told me they range 250 to 300 ft high on average. Sitting in a truck perched on the edge of a ridge road, they looked higher.

Brian drew my attention down to where the Mora river was snaking its way across the canyon floor. He told me how the river had been "*moved*" over the last "*hundred or so years*"—with much of the water-way's manipulation attributed to one of New Mexico's early governors—"*a powerful man*" who "*apparently decided to move a river*" for irrigation purposes. As a result, the river no longer "*meanders: the side to side flow*" through the middle of the valley. Instead it is was straightened and moved off to one side of the valley. Brian describes how "*when you straighten a river, of course, it also cuts down*" and when a river is "*incised*" in that way, it is no longer able to seasonally overflow its banks onto the flood-plain—disrupting the river's role within the landscape. Showing me how to read the landscape's features, Brian directed me to look at the location of the Cottonwood trees far below—explaining that the Cottonwood saplings typically grow at the edge of floodplains and how I can observe the shifting floodplain terraces through the presence of the Cottonwoods along those changed boundaries.

We continued to make our way up the ridge road and eventually leveled out up on the high ground above with the valley and river below. We climbed out of the truck and walked across a short grassy area towards the edge of the cliffs while Brian pointed out different areas of the landscape, telling short historical anecdotes about each; such as pointing out a section of ruins below as a late 1800's communal lands frontier settlement down in the valley that turned into a small market town and local brothel for soldiers from a local Fort, before the local religious folks from an adjacent town closed them down. Or pointing to a hill in the distance that still bears the name "Hermit Hill" after an 1860's hermit priest who was supposedly on the run from Vatican assassins and lived in one of the local caves for a time and preached to gathered crowds. Or gesturing to the sites of

former indigenous use-areas attributed to the Apache. Brian has the kind of memory and deep-knowledge of the landscape's cultural and ecological histories that allows him to pivot from stories about indigenous or settler histories to ecological processes that are all interwoven with how he understands the regional landscape of which the Refuge is part.

We returned to the truck and Brian told me some of the early history of the Denver Zoo's conservation department—from the 1990's—as we drove away from the canyon cliffs and up towards a rise in the landscape. The road passed along the bottom edge of the rise when Brian interrupted his story to cut the engine, point, and say, "*up the hill*", before picking up the thread of his story and beginning the short hike through the calf-high grasses toward the top of the rise he had pointed to. Once we reached the top of the rise—"*so this is the highest point on the ranch, 6,990 ft*" —Brian walked me in a circle around the hill top, pointing out the cardinal directions and explaining what could be seen in each direction: the names of the adjacent ranches, snippets about the relationships with local landowners, and even how to orient myself with certain landscape features if I were ever lost on the refuge. Spinning in a circle looking at the 360 degree vistas and processing the stream of information provided by Brian, I casually commented how "*cool*" of a place this must be to work and to have as an educational and research site for so many people. At which point he nodded in the affirmative and responded,

> "We reach a lot of people. Your typical wildlife refuge is open…and we're not. But we still see more people than most of them. But it is purposeful…And people leave knowing things they didn't know before they came."

Community & Relationships

We began to walk back down the hill, off of the rise, each of us looking around and thinking our own thoughts for the moment, when Brian said "*We also have really good*

relations with the community. So its conservation with community support." To which I replied,

> Me: "…And that was something that was largely attributed to *you*. The true emphasis that you put on the relationship building…as part of doing good and impactful work that spreads beyond the boundaries of the Refuge."

Brian shrugged slightly at this. Giving the impression that he was acknowledging that relationship building was important to him, but also that he was slightly uncomfortable with my directly attributing the overall positive position of Rio Mora in the region to his work. But after a moment he nodded and said, "*You know, a lot of people don't understand that…if you wanna [sic] have any kind of street cred, you have to be part of the community*." I responded to this by acknowledging how, from my perspective, "*that [position] is not part of the philosophy that comes with a lot of conservation work*." Brian was nodding before I had finished my statement, to which he replied,

> "No. And you can still live in a place and *not* [original emphasis] be part of the community. Look at the rich people around here <gestures to the indicate the surrounding cattle ranches>."
>
> So, you know…I think we engaged a lot of people through the schools. And, you know, my wife teaches in a school and I coached basketball. But you know, make yourself part of the thing. Be known."

This is the emphasis that so many had attributed to Brian's personal philosophy in the design and practice of environmental conservation. Not just 'community involvement' or inclusion—but rather, the distinction that the conservation areas, more importantly, the conservationists *themselves* must be part of the communities that surround the areas in which they work. This is a significant distinction from the idea of 'community engagement' in which the 'community' is perceived as an outside entity whose relationship to the conservation area activities are to be managed. But for Brian, from the very beginning it

was incumbent upon the conservation professionals—first himself and then others who were brought in—to integrate themselves into the wider social communities beyond the boundaries of the conservation area and its direct partners. To "*be known*." For Brian, it is only through this kind of socially integrative conservation practice that impactful, long-term activities are even possible—much less potentially successful.

We made it down the hill and climbed back into the truck. We had only made it a few minutes down the 'road' when Brian stopped the truck again because he wanted to check the water level in the one of the creeks we drove past—much of the restoration work being done at Rio Mora is focused on how water moves through the landscape. While we were walking along the rocky creek bank he began to tell me a story about how when he first arrived in the 2000's to manage Wind River, he happened to meet a local guy in town who was struggling to raise the money for one of the local little-league baseball organizations. So, Brian decided to donate $500 from the Wind River Ranch Foundation to sponsor the league. A few years later, the Wind River Foundation was trying to get permission to bring Prairie Dogs onsite as part of a restoration project, but the local cattle lobbying efforts over the decades had put up ordinance road blocks within the County Commission against Prairie Dogs in the county. Yet as it turned out, the local guy that Brian had once helped out with the Little League was now the county commissioner. "*But they overturned it so that we could do it. It might be the only place in the West where that's ever happened. So when we wanted it, he said sure*."

Figure 5. 5 *Dr. Brian Miller checking the water levels at a restoration site. Image taken by author.*

This particular anecdote should not be understated. In the western United States there is a long history of entrenched anti-prairie dog sentiment held by ranchers and farmers. In general there is a strong belief that prairie dog colonies damage the quality of grazing by "trimming" vegetation to have better sightlines and that the construction of their burrows possess as a physical hazard for livestock. This has led to extensive eradication programs and local ordinances—like the one encountered by Brian and Wind River Ranch—against reintroducing the species into regions where it has been intentionally eradicated. Yet as Brian credits, it was only through integrating into—and intentionally cultivating positive relationships with—members of the surrounding communities that the conservationists were in a position to successfully advocate for the conservation benefit of

Prairie Dogs on the landscape. Becoming potentially one of the only places in the western landscape to overcome powerful opposition by cattle lobbies.

Brian went on to share other anecdotes that he seemed to feel emphasized the impact of intentional relationship building, such as when he related the story of Wind River Ranch's transition to become Rio Mora National Wildlife Refuge:

> "And in 2012 when we became a national wildlife refuge the Las Vegas [New Mexico] newspaper voted it one of the top ten events of 2012. You know, when a rural western newspaper thinks the Feds getting more land is a good thing…And we had public meetings…200 people came. And not only did no one object, but they spoke up and advocated for us."

Much like the instance with the Prairie Dog colony approval at the county level, this above quotation reflects a more regional public sentiment held about Wind River Ranch, and eventually the Rio Mora Refuge. Importantly, federally owned and managed lands in the U.S. western landscape are often a socially contentious flashpoint. The U.S. federal government owns over half all acreage in the western United States; this includes lands held by the Bureau of Land Management, U.S. Fish and Wildlife Service, National Park Service, and the Forest Service. During my field research I heard numerous state and federal officials, as well as conservationists from private organizations, acknowledge the social conflict and practical challenges that are associated with negative public sentiments about federally held lands—as extensions of negative sentiments about "the feds" or national government more broadly.

In the specific contexts of conservation activities undertaken on federally owned or managed lands, negative sentiments held by the public can often challenge conservation work whose impacts may stray over the line onto privately held land or federal land that is leased for livestock grazing or other private/economic activities. Yet even set within this

contentious socio-political landscape, Brian Miller and those associated with growing Wind River's conservation programs and eventually facilitating the transition to a federally owned Wildlife Refuge, were able to overcome many of the conflicts and opposition that can so often arise when federal agencies become involved in regional landscapes. Arguably, Brian's acquired social capital—an intentional aspect of his personal conservation practice philosophies—was inherited by the U.S. Fish and Wildlife Service. To the extent that, not only was there no vocal opposition to the creation of Rio Mora National Wildlife Refuge, but their 2012 dedication event was lauded in local newspapers with a surprising fanfare. As Brian said to me, it is a rare thing when a "*rural western newspaper thinks 'the feds' getting more land is a good thing*."

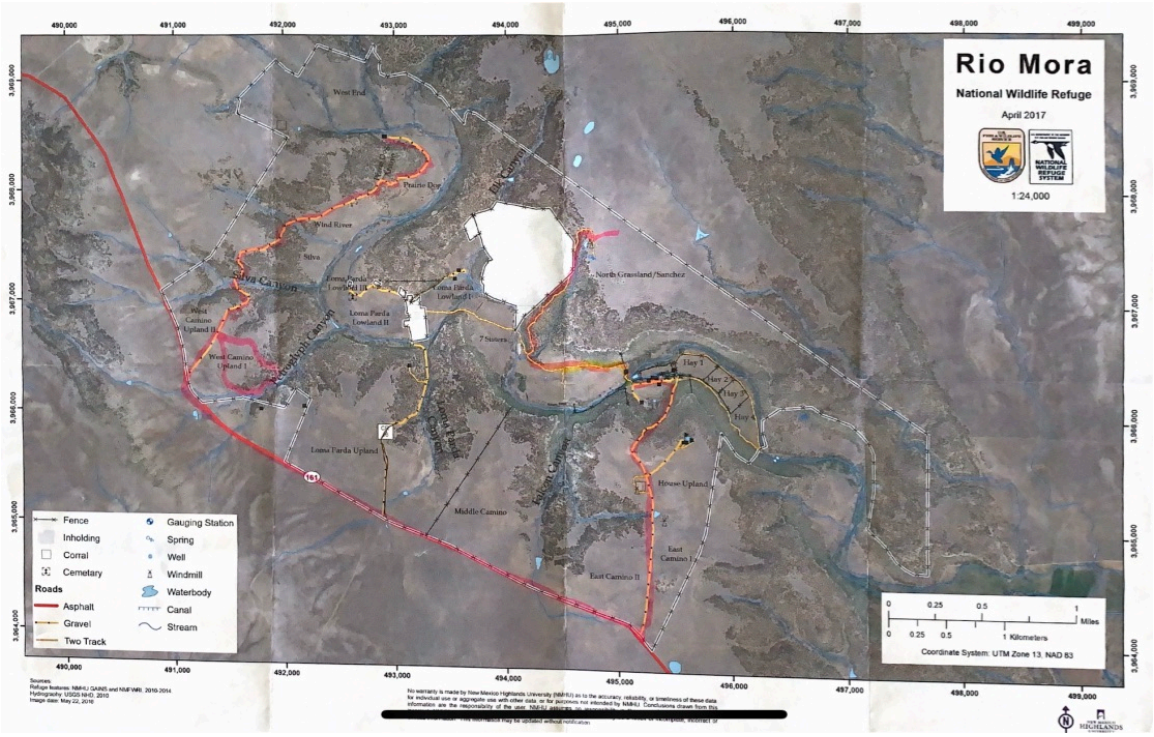

Figure 5.6 *Scanned Image of Printed Rio Mora Refuge map, given to author, on which Dr. Miller highlighted the route taken during interview.*

"If you are going to keep it exactly as it was…then you have to keep the Bison herd……and you have to keep the tribal involvement."

Another result of Brian's conservation philosophy and practices that the U.S. Fish and Wildlife Service inherited, was the established relationship and functional partnership with regional Native tribes. As Dr. Ramirez told me previously, Rio Mora is the only place in the country where tribal Bison graze on federal lands—and the initiation of that novel reality is largely attributed to Brian Miller—before being carried on by people like Dr. Ramirez, himself, as Director.

We were climbing back into the truck while he was finishing his story about the 2012 designation ceremony. At which point, he realized that he should explain the history of the Bison herd and Native partners at Rio Mora:

> "…okay the story behind the bison…is that it was [originally] a partnership between the Jicarilla Apache who are five hours away. And they didn't have permission to graze bison on their lands—because it was 'cattle controlled'[41].
>
> So, they *originally* came over here looking for medicinal plants…the elders. And they [had] wanted to do it on the national monument. But [the federal monument staff] said, 'you can't pick plants on federal lands…but we know this ranch just to the south of us, and I am sure that guy will let you do it.' Which was me. And of course, we did. <chuckles>
>
> And while we were talking [with the Jicarilla elders], I said, [how] it would be really nice to share a herd—on places that were too small to let Bison do natural migration…and one of the elders said, 'now you're talkin'. And he called back in a few months and said 'someone is going to give us 10 bison…' and I said, 'well…bring them here. And you know, we can start your herd…and [then] when you get permission [to graze on your own lands] you'll already have a herd ready.' So they get those 10…and then the Inter-Tribal Buffalo Council gave them 35 more the next year [from a herd in California that another tribe was unable to keep]…They gave them to the ITBC and they gave them to the Jicarilla.

[41] This is a reference to the conflict in some western states between groups that wish to incorporate Bison as managed grazing herds, and the existing cattle industry and its lobbying efforts who seek to prevent that.

Brian went on to explain that between 2007 and 2010 there was a series of events as the Jicarilla herd grew that resulted in Wind River Ranch Foundation owning ½ of the herd.

> "And in 2010 the Jicarilla got permission—they bought a ranch then they got permission to put bison on that ranch. And I said you know, 'why split the herd dynamic?'—They wanted to take their half—'why don't we try to raise money and buy your half? And then you can use that money to start a new herd?' [The Jicarilla agreed and] then we had the bison herd.
>
> [Around that time] Gene Thaw got disappointed with NGOs—he [had originally] wanted this to go to a non-governmental organization. And that sounded good in 2005…but then in 2008 the economy crashed and no NGO wanted it—Unless there was a $10 million endowment to go with it. And he got disillusioned. He did the picking…and unfortunately, he was a really nice guy…but he would kind of go on his gut. So, he was going to sell the place…so I went to Fish and Wildlife Service and said, 'well if he is going to sell, would you buy it and make it a refuge?' And they said, yes. And they wrote up a proposal for exactly what we were doing and gave it to him. And he said, 'well if you are going to continue doing exactly what Wind River has, then I'll just give you the land.'
>
> And then, that is when we started worrying about the Bison. [Meaning the USFWS' views on Bison herds]. [So we eventually sold the herd to the Pueblo of Pojoaque]. And then, the deal [with the USFWS] was…if you are going to keep it exactly as it was…then you have to keep the Bison herd…and you have to keep the tribal involvement. Even though…no Refuge has ever grazed tribal bison. And we were hoping this would be a model that could catch on in other places. And maybe it still will. Particularly in the southwest where tribes don't have a lot of land like they do in the north. So Pueblo Pojoaque took the bison and Fish and Wildlife occasionally got nervous about it and wanted it to become a federal herd…but, we would always beat it back down. And now it has been going long enough that I think it's got its own legs.
>
> You know how it is in a bureaucracy. After something is going they're not going to risk…why change it? So, that is the story of the tribal involvement.

Through Brian's story we gain further context for the social processes, thinking, and decision making that facilitated—and provided continuity for—the unique presence of tribally-owned and managed bison on a conservation restoration landscape. But he also offered greater insight into some of the challenges that were necessarily navigated in order

to ensure that the role of indigenous partnerships were maintained even in the transition from privately held restoration landscape to federally owned National Refuge; resulting in an indigenous/federal partnership that is unique within U.S..

Additionally, echoing an element I heard from Dr. Ramirez previously, Brian expressed a desire that the model for partnerships and restoration activities undertaken at Rio Mora, would become a "*model that would catch on other places*"—moving outside of the refuge boundaries. While this was specifically in reference to the potential for an expansion of tribal bison grazing on federal lands in the southwest, it is also linked to the wider philosophies about futures of ecological restoration and conservation—held by professionals like Brian Miller , Luis Ramirez, and Shantini Ramakrishnan—of which Rio Mora is an important example. Because, in their view, the present ecological moment requires 'out of the box [conservation] thinking'. Remembering how Luis had expressly stated that in his understanding,

> "Whatever we do here is pretty much insignificant, in the bigger context. But because we work with landowners, and other stakeholders…that right there is where we make the difference.
>
> So the only way is to work together. And that is the only way that we will be able to make it[42] happen.
>
> And you have to get those [sic] out of the box thinking…Move away from fortress conservation and [towards] more engagement with the community. It is how…it is the only way."

It is this kind of socially-integrative conservation philosophy and practice that makes Rio Mora, and the Denver Zoo Field Conservation Department staff that manage it day-to-day, standout within the conservation activity landscape. It might be possible that a

[42] "it" being successful landscape scale habitat restoration and conservation

surface level assessment—absent of the 'complex realities' of conservation(ists)—would only see 'Rio Mora National Wildlife Refuge' as just another protected area. Yet, through the eyes of the professionals who commit their careers to its management and restoration, it is what lies outside of the boundaries of the refuge that holds the most significance; both the people (e.g. community, private landowners, native tribes) and the ecosystems within which they are all embedded. Because there is an explicit recognition held by these conservationists that the traditional methods—the emphasis on 'fortress' protected areas—are insufficient to the task of protecting landscapes, habitats, and species. As such, for these professionals, the "*only way*" forward is through the intentional integration of diverse publics into an expanded philosophy of conservation that moves far beyond protected area boundaries.

Financial Uncertainty & Multi-Partner Dynamics

Yet, the uniqueness and related potential for expansions of mainstream conservation practice that are wrapped up in Rio Mora are also interconnected to challenges that are a direct result of that organizational novelty. The inconsistency and instability of financial support for conservation activities is an exceptionally common—nearing ubiquitous—struggle for organizations engaged in this kind of work.

Recalling that the land which became the Rio Mora Refuge was donated—along with a time-limited financial bond—by the Thaw Family, when I was conducting interviews in 2018 the Thaw funding was approaching its end. With the looming conclusion of that original bond left by Eugene Thaw that allowed the Denver Zoo to take up the operational and financial management of the refuge—a necessity due to the USFWS' lack of available funding to financially manage the refuge at the time of its

donation—there were real questions regarding the operational continuity of Rio Mora. This uncertainty colored most of my conversations about the refuge during the summers of 2018 and 2019; the Denver Zoo FCON staff were passionate about sharing the activities at the refuge, but were also consistently deflated by the ongoing uncertainty of its future. I spoke about these financial and operational realities with FCON Director Graeme Patterson and Conservation Outreach Coordinator Erica Garroutte, but it was Brian Miller who shared with me in 2018 that,

> "…one of the things that we are worried about…in continuity, is what the new Zoo Director is going to do. Because they are basically spending out [the money left by Gene Thaw] and it will be gone in 12 months. And we need to know what is going to happen.
>
> But, [back] in 2017 they were thinking about pulling out of this place. So, our fate kind of hangs with who the new director is. [Zoo Admin] thought that conservation should…that the Thaw grant…when it ran it out, they would pull out. And I think we were able to convince [them temporarily] that no, that may actually do more harm than good."

Brian went on to describe the uncertainty faced by the staff of Rio Mora and the work they do there because of conflicting priorities and resulting financial constraints. Much of my conversation with Dr. Miller links back to discussions with other professionals presented in Chapter 2, in which zoological institutions are increasingly foregrounding a public narrative about their commitment to conservation efforts, but that the professionals who work within them and are privy to close observations of administrators and executive boards, are less convinced.[43] Underneath much of this

[43] Like other NGOs and non-profits, increasingly zoo-executives and boards are comprised of non-zoological/non-conservation professionals; they are generally individuals who have been successful in the business sector. However, specifically in the zoological context (where field conservation is relatively new and peripheral) those executives who are drawn to zoo's are arguably more influenced by and familiar with the 'traditional' zoo identity (and business model) of public animal exhibition. This position makes them less familiar with (or oriented towards) conservation commitments beyond the zoo-collection—as financial expenditures and outside commitments from the 'zoo core.'

uncertainty lies a central conflict over a misalignment of priorities about the role of zoological institutions and their future within environmental conservation work. As Brian stated earlier, '*zoos were dragged kicking and screaming into conservation'* by a small handful of dedicated individuals who took administrative reigns and made decisions that caught public attention. Compounded by the internal push from traditional zoo staff (e.g. keepers) who also saw the possibilities for real-world application of their skills. Yet, recognition of that wider administrative reluctance to invest in conservation still lingers in how current zoo-adjacent conservation actors approach their relationships with zoological institutions. They engage with these organizations and go to work for them because they understand the potential in mobilizing the zoological framework of resources (financial and human) to participate in addressing issues of conservation interest. Yet—in so many conversations with them—they consistently remained skeptical of the degree and authenticity of commitments by zoo bureaucracies. Conservationists are brought to the zoo-table by the allure of the potential they perceive, but they seem to always be glancing out of the corner of their eye awaiting the next unfavorable decision from the Zoo Board.

Listening to Brian describe the conflict between organizational decision makers who remain inclined to prioritize the traditional model of zoological institution activities (e.g. animal collections and public exhibitions) and those who recognize the potential for leveraging the existing capacities of zoological institutions and reshaping them towards a future more committed to conservation, I was prompted to explain how I thought that Rio Mora and the work they do should be "*something that [is] pointed to from the zoo's perspective*" as the direction that zoos ought be moving in. To which Brain nodded in agreement and described how in his view, zoos and aquariums should be seeing the shifting

public perceptions of zoological institutions and their core practices as a "*window into the future*" and that decision makers should be facilitating the investiture of their time, professional skills, and resources into these expanded conservation roles. Instead, they are contemplating extracting themselves from a model of conservation praxis embodied in Rio Mora and the future potential that its 'webs of [socio-ecological] relations' represents.

"A window into the future"

Rio Mora National Wildlife Refuge, as I was able to observe it in 2018, is an example of what an expanded conservation praxis for addressing ongoing environmental change and challenges might look like. Rio Mora NWR is the only place in the United States where Bison, owned and managed by an indigenous tribe, are grazed on federally owned lands; facilitating habitat "*ecological restoration*" and indigenous "*cultural restoration*". Rio Mora represents the first example in the U.S. where the Fish and Wildlife Service "*has taken the risk to partner with other organizations to manage protected areas*" and especially taken on an organizational partner (The Denver Zoo) to handle day-to-day operational management of the refuge. Yet, while the multi-partner organizational structure is itself an important component of Rio Mora's potential, I argue it is how Rio Mora's structure shapes its role within the surrounding socio-ecological landscape—as facilitated by its conservation professionals—that represents its most substantial potential.

As Larsen and Brockington (2018) set forth, anthropology must attend to the 'complex realities' of conservation(ists), organizations, and the 'webs of relations' that are inherent within conservation activities, but less of often examined by anthropology. My initial research attentions to investigating those relational webs were oriented to examining the connections between: endangered short grass prairie, restoration of a watershed

ecosystem, a zoological institution, bison, a native tribe, a university, and a federal agency. However, as a result of attending to the perspectives, motivations, and experiences of conservation professionals I was led to see unexpected connections, through their eyes. The webs of relations that shape the activities around Rio Mora are not just those which are contained *within* the boundaries of its 4,200 acres—not just focused around the Refuge as a traditional protected area space. But rather, Rio Mora is embedded within and connected to a much wider social and ecological landscape. The 4,200 acres of Rio Mora, as Dr. Luis Ramirez put it, "*are not enough…Yellowstone is not enough…governments cannot do it…non-profits will not make it…you have to work with land owners…you have to engage with the community…we have to do it together*." Rio Mora, the physical landscape and the conservation philosophies it represents, are centered within this recognition; an acknowledgment that traditions of protected area spaces as mainstream conservation practice are insufficient to the task of facilitating the landscape scale health of ecosystems into the future. Rio Mora NWR—its habitats and the restoration work undertaken within it—are a 4,200 acre microcosm case-example for the one million acre Rio Mora Watershed that stretches across northern New Mexico towards southern Colorado. But beyond the specific context of the watershed, Rio Mora is a model for multi-partner management *and* for the possibilities of an expanded conservation mission and praxis beyond protected area borders. In the face of ongoing environmental change, the continued insistence upon protected areas as a central conservation priority is also a continued denial of social-ecological landscapes and the potential contained with investing in conservation activities that explicitly recognize them. Rio Mora remains a relatively nascent example of an expanded relationality within conservation practice; an expansion

that includes habitats/ecologies, local publics, students, and community engagement *on* the refuge, as well as tribal land managers, private land owners and regional ecosystems *beyond* the refuge boundaries. The 'webs of relations' that shape the contours of this conservation action model extend beyond the formal refuge partners and seek to interconnect Rio Mora with the wider regional socio-ecological landscape. Extending its role and influence far beyond that of a typical protected area, with a body of philosophies that eschews the *inward* focus and boundaries of protected areas and is consistent in its *outward* facing orientation.

In reiteration, I argue that Rio Mora, and the contours of this conservation-action model, are also a particularly important prospect for the expanded opportunities of zoological institutions moving forward. This was especially apparent when Brian, Luis, and Shantini were describing the wider activities of the refuge—far more than I was able to highlight in this chapter alone—which include: habitat restoration exhibitions for local ranchers and land managers, land management consultations for local land managers, hands-on habitat restoration and ecology workshops for 'ranch-kids' who will likely one day manage vast properties, youth from indigenous communities who are able to take part in the herd activities and cultural learning that are facilitated through the Bison herd, or high school and university students from Latino and indigenous populations who conduct research[44] and work alongside refuge partners. All of these activities occur in tandem with Rio Mora's status and activities as a National Wildlife Refuge, for which it consistently exceeds the Fish and Wildlife Services' assessment criteria [interview: Brian Miller].

[44] Via Highlands University as the research partner.

Unlike more typical conservation agencies and organizations—and the experts who are drawn to work within them—zoological institutions have a long history of navigating environmental work *and* wider engagements with diverse publics, in their role as public institutions. As I highlighted previously, a theme of my conversations with 'zoo-adjacent' conservationists was how their recognitions of the 'social' complexities and requirements of conservation work and their acknowledgment of the potential for leveraging existing public engagement capacity of zoological institutions, brought them to the 'zoo-table'—even with the challenges of shifting administrative support for conservation actions. The 'zoo-adjacent' professionals at Rio Mora, alongside the refuge partners, are doing the publicly integrative work that zoological institutions are particularly positioned to do, and I argue the structure and capacity of this model is a more genuine representation of the kinds of 'impacts' that many traditional zoos and aquariums seek to claim via their campus-based animal exhibitions and related education programming[45]. This conservation-action model is explicit in its recognition that a refuge or protected area, like Rio Mora, is only as significant as the role it plays in facilitating a socially integrative, landscape scale conservation movement; because, citing Dr. Ramirez once more, "*we have to do it together*."

[45] Many research participants mentioned their criticism of zoos and aquariums claiming campus-based 'education' activities under their contribution to 'conservation actions'. Noting that there is insufficient data to support that zoo-based education activities have statistically significant real-world impacts on visitors' conservation-related behaviors.

Update:
Denver Zoo Conservation & Rio Mora National Wildlife Refuge in 2021

In response to the SARS-CoV-2 pandemic and closure of the Denver Zoo's main campus in March of 2020 , the Denver Zoo's executive board took the action to dissolve the Field Conservation Department and terminate the positions of the majority of the conservation staff; including all of the staff with whom I worked most closely during my fieldwork. Following this dissolution of the FCON department in early 2020, zoo leadership undertook a process of reorganization that would result in a fundamental change in Denver Zoo's relationship to conservation work. While I remain in close contact with former staffers, as a result of the reorganization I am no longer connected with the Zoo's programming or aware of the decision making processes and priorities. As of Spring 2021, Rio Mora National Wildlife Refuge had been removed from the Zoo's website.

EXECUTIVE SUMMARY

PROJECT CONTEXT

The 2013 United Nations IPCC Fifth Assessment Report documented global temperature averages having increased by 0.85°C (1880-2012), a 19cm average rise in sea levels (1910-2010), and continual reduction in Artic sea ice since 1979 (UNIPCC 2013). As of the summer of 2020, the International Union for the Conservation of Nature's (IUCN) Red List of Threatened species documented that 27% of all species assessed by the IUCN are designated as threatened with extinction. That amounts to more than 31,000 species out of approximately 116,000 species across taxa being categorized as either Vulnerable, Endangered, or Critically Endangered. The IUCN identifies that the primary threat to 85% of the species listed is loss of native habitat (IUCN Red List Update 2015). Also in 2020 the United Nations' Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) released their Global Assessment. In their report they called for 'transformative changes' in the face of global environmental changes. The report documents a 30% reduction in global terrestrial habitat integrity, 9% of global species without sufficient habitat for long-term survival, 25% of total global species across taxa threatened with extinction, 40% of all amphibian species threatened with extinction, and the large scale global extinction potential for nearly 1,000,000 species in the relatively near future. (UN IPBES 2020)

Amidst the realities of accelerating climate change, habitat declines, ecosystem (re)configurations, biodiversity declines, and species extinctions, there are corresponding

transformations occurring in the field of conservation as organizations and professionals seek to address these contemporary challenges and uncertain futures.

AIMs OF THE RESEARCH

The overall aim of this research is to expand the conventions of anthropological research on nature conservation to include actors and intervention activities that have be underrepresented by the discipline's historical focus on transnational protected area conservation actions. Research addressing nature conservation, within anthropology, has most often operated at the organizational scale, with particular focus on transnational conservation Non-Governmental Organizations (NGOs) and the impacts of their activities on local populations and indigenous communities. While vitally important, as a result of these disciplinary conventions there remains an absence of anthropological research that investigates the greater heterogeneity of conservation actions. Which as this research supports, are especially important to understand amidst accelerating habitat loss, species declines, and extinctions. In addition, this research predominantly focused its ethnographic examinations on conservation activities in the United States, less often examined in anthropology.

In fulfillment of these aims, this participatory ethnographic research was undertaken directly with conservation professionals working on habitat and species level conservation actions and who were closely associated with zoological institutions in the U.S.—people this research calls "Zoo-Adjacent Conservationists."

Zoological Institutions (e.g. zoos, aquariums, botanic gardens) have been increasing their financial support and direct participation in conservation activities in recent history. Additionally, in the context of ongoing environment change, conservation actors

are increasingly incorporating 'more interventionist' strategies of conservation praxis in order to preserve components of nature. Many of these 'more-interventionist' strategies draw upon the capacity of zoological institutions in their ability to support features of conservation that include captive breeding, reintroductions, and translocations; as well as activities that more directly incorporate a diversity of stakeholders, partners, and the wider public. Which, as long-standing public facing organizations, zoological institutions are particularly positioned to support.

Ongoing and cascading impacts of environmental change are prompting transformations in conservation as the diversity of actors and activities which fall under that moniker working to intervene in biodiversity declines. The ultimate aim of this research was to investigate the features of those transformations through the activities of conservation oriented organizations and the experiences of conservation professionals who are committed to addressing issues of environmental concern.

This research has an additional aim of encouraging conventions of anthropological research on nature conservation beyond the boundaries of 'transnational protected areas' and into connection with the greater diversity of people, organizations, and actions that are also representative of the heterogenous human-environment relations which comprise contemporary conservation. Because—as this research argues—as the social and ecological configurations of the world are challenged and undergo reconfigurations, it is more vital than ever that environmental anthropologists position themselves and their expertise to participate in addressing those challenges. In order to engage as participants in actions that prioritize human *and* environmental equity—with conservation being one such arena of participation—it is necessary to ensure the expansion of anthropological analysis

and understanding of the people and practices that truly comprise this arena of human-environmental relations. Because it is only through the expansion of those contextualized understandings that anthropologists and other environmental social scientists will be positioned to identify people and issues of overlapping concern, shared ethics, and opportunities for novel (and vital) collaborations.

RESEARCH METHODS

This participatory ethnographic field-based research was conducted between July of 2018 and August of 2019. During those 13 months, research activities were primarily undertaken with 'zoo-adjacent conservationists' working on six distinct projects, from four zoological organizations (three zoos and one botanical garden) in four different U.S. States. In addition to those primary organizations, additional research activities were conducted at professional conference and meetings.

Data collection activities for this research consisted of extensive observation and participant observation, informal and semi-formal interviews, and observational attendance in professional spaces and at professional conferences/meetings. From those activities, this research is based on semi-formal interviews with 25 different conservation professionals, informal interviews with 35 professionals, 25 recorded and transcribed events/presentations at professional meetings, and 13 months of observational field notes. The above accounts for the number of individuals who participated in semi-formal and informal interviews, not the number of interview instances. Qualitative data analysis for this research consisted of thematic analysis of transcribed field notes, semi-formal and informal interviews, as well as all professional presentations, talks, and panels.

The majority of observational, participatory, and interview data collected with the different organizations, programs, and individual professionals were the result of a practice that this research refers to as "working for" the data. In which the researcher negotiated periods of continual access to these organizations and their conservation program activities as a result of 'working for' them. Generally this practice amounted to the researcher working alongside conservation professionals assisting in their daily activities, weekly routines, special events, and seasonal practices.

OVERVIEW OF CHAPTERS AND FINDINGS

CHAPTER TWO: Ongoing changes to the environment are prompting changes within the people, groups, and organizations that are committed to preserving global ecologies and species through conservation activities.

PART ONE: Specifically within the context of Zoological institutions and their 'umbrella organizations' (e.g. Association of Zoos and Aquariums (AZA)), there is an ongoing evolutionary transition, in which these organizations—individually and collectively—are undertaking a change in identity. Zoos and aquariums are working to evolve and emerge as 'conservation organizations'—rather than just organizations that support and participate in conservation activities.

However, this identity transition remains internally contested. It is true that AZA accredited zoos and aquariums in North America have undertaken an increase in 'conservation-related' activities in their recent history. And yet, this research shows that many internal conservation actors retain significant skepticism about zoological institution's broad and lasting commitments to on-the-ground conservation.

The Association of Zoos and Aquariums, which accredits over 230 institutions in North America, reports that their members 'fund over 2500 conservation projects in over 100 countries and spend an average of $160 million annually on conservation initiatives' (aza.org). However, at the scale of individual institutions that commitment to conservation only garners an average of 1-5% of institutional annual budgets. Leaving, on average, well over 90% of total organizational budgets committed elsewhere—predominately spent on costs associated with the core-practices of maintaining zoo's and aquarium's animal collections on their public campuses. In addition, this figure of 1-5% of total budgets committed to conservation is, itself, contested by internal conservationists. The activities supported under these budget allocations take an expansive view of what qualifies as 'conservation'. Whose language and related actions are being interrogated as these organizations work to expand their material support for species and habitats into the future; negotiating what 'counts' as conservation.

In addition to skepticism related to these misalignments of organizational fiscal commitments and their public narratives, zoo-adjacent conservationists also consistently pointed to the influence of public perceptions on this evolution in zoo and aquariums identities. Numerous research participants nodded directly to a 2018 AZA study, whose results showed that the two activities that could elevate declining public perceptions of zoo activities were investments in 1) conservation and 2) animal welfare. These research participants acknowledged that it was in the best financial interest of zoological institutions to amplify a conservation identity in order to 'remain relevant' in the public mind. Yet, conservation actors working within these institutions remain cautious of long-term commitments to on-the-ground conservation by decision makers at the executive levels of

these organizations. Recognizing that executives are increasingly "saying all the right things/and using all the right conservation words", but that 1-5% of a total budget does not a conservation organization make. Furthermore, internal conservationists are cautious of what they perceive as "marketing spin", potential "greenwashing", and fair-weather conservation commitments. Because ultimately conservation activities remain a peripheral fiscal commitment by these organizations (albeit with an outsized public narrative), and there are persistent questions about whether these organizations will maintain those commitments, or retreat to their core priorities, when challenges arise.

PART TWO: Conservation actors, in the United States and internationally, are increasingly grappling with the realities of environmental change. The cascading effects of global scale changes are facilitating ecological transitions and reconfigurations, biodiversity declines, habitat loss, and species extinctions. In the last few years conservation actors have established the ongoing reality of a "sixth mass extinction"—an event that was previously the subject of debate—and as a result, conservationists are confronted with a present ecological moment and likely futures in which the 'structure and composition' of 'nature' are altered.

In the context of these ecological transitions and reconfigurations, some conservationists—like that of Dr. Stanley Price—are calling on the conservation 'community' to effect a transition of their own; in their philosophies and practices. These proposed transitions are predicated on conservation as an applied field, and conservationists themselves, moving beyond their 'nostalgia' for the past that is a core feature of their 'restore'-ation activities. Letting go of this nostalgia is necessary, it is argued, because in the face of climate change impacts many future ecologies will 'likely

look less and less like those of the past'. Ultimately, there are those within the field of conservation who are putting forth a need for conservation philosophies and related praxis to set aside its desire for the past, and instead orient their ideas and activities around present and future ecological realities.

Additionally, amid the relatively recent affirmation of the ongoing 'sixth mass extinction' in tandem with related impacts of global environmental change, there is an increased investment in incorporating more interventionist models of conservation action within the 'mainstream'. Operating at the species scale, these 'more-interventionist' models of conservation are those in which actors are engaged in increasingly 'hands-on' activities; or what Dr. Axel Moehrenschlager described as being fundamentally about "moving species around." Such activities can include: species translocations, species reinforcements/reintroductions, proxy-species/ecological replacements, and assisted colonization.

The desire, on the part of these conservation actors, to see an increased utilization of translocations (umbrella term) within the conservation mainstream is directly connected to their acknowledgement that the cascading ecological impacts of environmental change (e.g. climate change) are rendering traditional 'mainstream' practices insufficient to the task of preserving species into the future.

CHAPTER THREE explores conservationists' day-to-day realities and experiences that comprise their efforts to conserve the Eastern Indigo Snake (Drymarchon couperi) via a program of reintroductions into areas of their historic range where the species had been previously extirpated. Chapter 2 examined the perspectives of conservationists who are,

in the face of biodiversity declines, advocating for greater inclusion of 'more-interventionists' modes of conservation action into the mainstream; this chapter examines how conservationists enact those interventions on-the-ground.

The Central Florida Zoo's Orianne Center for Indigo Conservation (OCIC) is located on a 25 acre property in Eustis, Florida, adjacent to the Seminole State Forest. The OCIC is an example of a synthesis of 'mainstream' conservation activities (e.g. protected landscapes, restoration) and those 'more-interventionists' modes of action (e.g. wildlife breeding and reintroduction), discussed in Chapter 2.

While the wider reintroduction project is in conjunction with multiple partner organizations and agencies, the OCIC staff are charged with sole responsibility of caring for the captive Indigo population housed at the OCIC facility that form the foundation of the reintroduction project's breeding program. In accordance with the Indigo's seasonal reproductive patterns, the staff place Indigos into breeding pairs in the fall and, if successful, collect the resulting eggs for incubation in the spring. The resulting hatchling Indigos are raised by the OCIC staff (or by the staff at one other partner organization) for the next ~2 years. Once the offspring reach an appropriate size and maturity, they are prepared for release.

Each year since the beginning of the project, just over a decade ago, the captively raised Eastern Indigo's are released into native habitats in late-spring and early-summer. At present, the reintroduction project has two sites: Conecuh National Forest in Alabama and Apalachicola Bluffs and Ravines Preserve in Florida's panhandle. Both of these sites were selected due to meeting the conservation project's overall criteria; but most

significantly, they are examples of extensive intact Indigo habitat within their historic range and there were no existing Indigo populations in these regions.

The findings of this chapter explore the relational features of this mode of conservation action; between the conservationists (OCIC staff) and the individual animals within their care. The staff at the OCIC represent a population that are referred to in the research as 'zoo-based' conservation actors. A category that applies to individuals whose training and experiences within the field were centered around typical zoo-based activities. However, the actors at the OCIC shared an element of their personal motivations, in which they desired to maintain the up-close experience of hands-on animal work, but they wanted to dedicate that work to something beyond the typical zoo-spaces of exhibition. When pairing this manner of up-close animal care seated within wider project goals for wildlife reintroductions, this kind of interventionist conservation action yields particular relations between conservation actors and the animals in their care.

Ultimately, the day-to-day activities of the OCIC team—and their place within wider project goals—are oriented around individuals and the animals in their care traversing together along a 'captive-to-wild continuum'. Arguably, this continuum that oscillates between 'captive' and 'wild' began at the beginning of the Indigo Reintroduction Project a decade ago when "founder population" animals were brought into captivity from their native habitats. Many of these 'founder' animals were brought into the project when their gravid (egg-laden) females were captured in the wild, laid their eggs in captivity, and were then returned to their habitat. The resulting off-spring from those wild-produced but captive-hatched eggs formed the basis for the ongoing breeding project.

Characterized by a series of events and observations that mark progress along the continuum, this chapter examines aspects of the conservationist/wildlife relationship that are a significant feature of this manner of hands-on conservation action. Explored, in part, through the story of "Gale"—an Indigo in process of becoming wild—this chapter examines how conservation actors come to understand the once captive animals in their care has having undergone changes that are observed by these professionals as 'becoming wild'. Ultimately, seeing 'wild' Indigos released/reintroduced 'back' into a native habitat where they 'belong' and where they are fully independent from the humans whom they were once so dependent, is the ubiquitous goal shared by these professionals.

While the connections and relationships between these professionals and the Indigos is concrete and material, those conservationist/Indigo relationships should also be understood as representational. Indigos, a charismatic and storied species of the southeastern forests, are a representative of those regional ecosystems; systems that are—like the Eastern Indigo—under threat. Caring for the Eastern Indigo and facilitating their transition along the captive-to-wild continuum is a material and representational act of care for their wider ecosystems. Connection to the 'lord of the forest' is thusly a connection to the forest itself, and a fulfillment of the environmental relationships that motivate these conservation actors.

CHAPTER FOUR examines the scientific knowledge politics that influence how conservationists design and enact contemporary conservation actions. This chapter draws on ethnographic data from two field sites (Colorado and Florida) and from the environmental politics surrounding four different species: the North American Mountain

Goat (Oreamnos americanus), American Pika (Ochotona princeps), the Striped Newt (Notophthlamus perstriatus), and the Eastern Indigo Snake (Drymarchon couperi).

This chapter examines and discusses the politics associated with these four species and is organized into three sections. First, an exploration of the 'native politics' associated with the contested status of the North American Mountain Goat in the Colorado Rocky Mountains. Second, is an examination of the influence(s) of the U.S. Endangered Species Act (ESA) and the 'politics of listing' associated with the American Pika and the Striped Newt. Third, is an assessment of the real-world implications of taxonomy and taxonomic (re)classifications on existing conservation activities. Examined through the conflict surrounding a proposed 'species split' of the Eastern Indigo (Drymarchon couperi) that would have impacted over a decade of species recovery efforts in the southeastern U.S.

PART ONE: Within the border of the U.S. state of Colorado, the North American Mountain Goat (Oreamnos americanus), occupies a contested status surrounding its 'native-ness' on the Colorado landscape. This conflict over the mountain goat's status is linked to contestation over the evidence of the species' historical presence in Colorado's section of the Rocky Mountains; whether it was once part of the Colorado's ecosystems and was then hunted to extirpation by the late 1800's or whether it was never present at all. Because of this conflict over that evidence, when the species was translocated into multiple sites across the Colorado Rockies between 1947 and 1972, some stakeholders understood these actions as a re-introduction of an extirpated native animal, while others understood it to be an introduction of a non-native species.

This 'native' status contestation persisted through the latter 20th century as the Mountain Goat population spread beyond its initial translocation sites. In 1993 the

International Order of Mountain Goats—a species advocacy group—successfully petitioned the Colorado Wildlife Commission to designate the species as 'indigenous' to Colorado. Yet, according to people like Professor John Mitton of University Colorado Boulder, the majority of professional biologists continue to view the mountain goat as a "introduced non-native species" within the state that threatens to outcompete other species for resources; such as Big Horned Sheep (Orvis canadensis). Biologists also note that the driving motivations behind the original translocations, and the advocacy for its 'native' status, largely originated from wildlife hunting lobby groups who desired mountain goat populations in Colorado for recreational hunting purposes.

However, while the Colorado Wildlife Commission officially recognizes the mountain goats as an 'indigenous species', the CWC's designations are not ubiquitously accepted. In the summer of 1997, the first Mountain Goats were observed in Rocky Mountain National Park (RMNP). Encompassing 415 square miles of intact habitat, the arrival of the goats prompted the National Park Service (NPS) to commission their own study on the status of Oreamnos americanus, which ultimately concluded that the species were never native to Colorado and if allowed to concentrate their populations, they could become destructive to native ecosystems. Following the study, and still today, the National Park Service designated the goat as an "alien" species within the Colorado landscape. This designation prompted the formation of a policy in which goats that travel into the park are either captured and removed (when appropriate) or hunted by NPS staff.

These status contestations, between 'indigenous' (Colorado Parks and Wildlife) and 'alien' (National Park Service) result in the production of a 'patchwork conservation landscape'. A patchwork in which a species whose ancestors were translocated by human

actors with particular motivations and values, can cross over a line of environmental politics drawn upon the landscape and into an area governed by different stakeholders and a completely different set of environmental conservation values. The result of these conflicting scientific knowledge politics is that the animals in question, exist in a liminal state of belonging within the Colorado Rockies ecoregion; whose status (and very existence) is ultimately dependent upon the scientific politics of the human actors that manage the land.

PART TWO: Within the United States, the Endangered Species Act (ESA) is considered the 'flagship' federal conservation legislation. Signed into law in 1973, the ESA is charged with the protection of imperiled species that are threatened with extinction. As written, the ESA has two primary missions: first, to designate species as 'threatened' or 'endangered' through a process of petition and review, and second, to enact recovery efforts (facilitated by the U.S. Fish and Wildlife Service) to prevent further declines and until the species is no longer in danger of extinction.

This chapter examines the 'politics of listing' through the lens of two species in the U.S.: the American Pika (Ochotona princeps) and the Striped Newt (Notophthalmus perstriatus). The American Pika is a small lagomorph—related to rabbits—that generally live in talus fields at altitudes above 7500-8000 ft in the Rocky Mountains. The Striped Newt is a small amphibian (5-10 cm) and are endemic to the ephemeral wetlands of southeastern Georgia and north-central Florida.

Following a multi-year legal conflict between the Center for Biological Diversity (CBD) and the U.S. Fish and Wildlife Service, the USFWS denied the 'petition to list' the American Pika under the ESA in 2010; citing a lack of evidence that the species will be

"in danger of extinction in the foreseeable future." Importantly, the CBD's petition to list Pika under the ESA was part of a larger environmental political strategy to inject future climate change scenarios into the calculus of the Endangered Species Act review. With the ESA's primary mission to protect species from extinction "as a consequence of economic growth and development untampered by economic concern and conservation", if the Pika petition had been successful it would have opened the door for the recognition of future impacts of human-induced climate change within the scope of Endangered Species review, listing, and subsequent conservation actions. Potentially maneuvering the U.S. federal government into a position of addressing the causes of climate change more directly.

Following that USFWS decision in 2010, the Denver Zoo's Field Conservation Department and Rocky Mountain Wild—an environmental/conservation non-profit—founded the Front Range Pika Project; the FRPP was initiated to address the USFWS' claims of "uncertainty about whether the species was likely to be vulnerable to climate change across the entire range." The FRPP, which would eventually expand beyond the Front Range (where they were working with Colorado Parks and Wildlife) into Rocky Mountain National Park (partnering with the National Park Service) and the White River National Forest (partnering with the U.S. Forest Service)—bringing together the founding conservation organizations with state and federal agencies to facilitate a range-wide citizen-science research project.

IN 2008, the founder and then President of the Coastal Plains Institute in Florida, Dr. Bruce Means, filed a 'petition to list' the Striped Newt (Notophthalmus perstriatus) under the Endangered Species Act. That same year, the USFWS ruled that "listing was warranted", but that the Striped Newt did not rank high enough on the Service's 'priority

ranking scale' (scoring an 8 out of 12) to warrant moving forward with a final decision. As a result, the Newt joined other species in the Service's backlog. 11 years later, in January of 2019 the USFWS released their final decision on the status of the Striped Newt; stating that following a "review of the best scientific and commercial information…it is not warranted at this time to list the species."

Mirroring elements of what was observed in with the American Pika listing decision & resulting Front Range Pika Project, following the USFWS' decision in 2008 not to move forward, the Coastal Plains Institute founded the Striped Newt Repatriation Project. The project was initiated to intervene in observed regional declines in newt populations and in response to the USFWS' 2008 decision. Working alongside other members of the Striped Newt Working Group—including zoological institutions breeding Newts for release—as well as state and federal agencies in Florida, the Coastal Plains Institute's repatriation program has been working intervene in Striped Newt population declines in Florida.

Perhaps most interesting are the parallels between these two examples of "listing politics" as an window into the influence of scientific knowledge politics. The conservation projects oriented around both of these species, in very different contexts, yielded interesting similarities. Founded—directly or in part—in response to the USFWS' decision not to list these species under the ESA, both of these conservation initiatives attracted zoological, non-profit, state-level, and other federal-level agency partners into the projects' subsequent activities. The Forest Service and the National Park Service both reached out to become involved in the Front Range Pika Project, and the Striped Newt Repatriation Project takes place on Forest Service lands; releasing captive bred and raised

newts into the ephemeral wetlands of the Apalachicola National Forest. Ultimately the challenges surrounding ESA listing politics for these two species results in simultaneously constraining certain conservation actions while also motivating other unique conservation configurations.

PART THREE**:** This section explores the scientific knowledge politics at play when taxonomic (re)classifications are proposed within the context of ongoing conservation actions.

Taxonomy, as the 'science of organismal classification', serves as the underpinning logic for how scientists organize and understand organisms in relationship to each other. Within taxonomic logics, the categorization of organisms into 'species' categories is undertaken through the employment of different 'species concepts' (e.g. typological, biological) which rely on different sets of criteria in order to place like-organisms into a 'species group'.

As was outlined previously, the Central Florida Zoo's Orianne Center for Indigo Conservation (OCIC) is currently the only conservation breeding facility in the world dedicated to the reintroduction of the Eastern Indigo Snake (Drymarchon couperi). The Eastern Indigo is currently listed as 'threatened' under the U.S. Endangered Species Act. The OCIC—along with the other partners in the Indigo Reintroduction Project—are engaged in the captive breeding, rearing, and reintroduction of Drymarchon couperi into areas of the species' historic range where it has been extirpated from those ecosystem. The two current sites for these reintroductions are Conecuh National Forest in southern Alabama and Apalachicola Bluffs and Ravines Preserve in Florida's panhandle region.

In 2016, Krysko et.al. proposed a 'two species hypothesis' in their paper A Cryptic New Species of Indigo Snake. The proposal would see Drymarchon couperi—currently the subject of the reintroduction project—split into two separate species; D. couperi and D. kolpobasileus. Based upon molecular and morphological features, the authors argued for a recognition of the geographic distribution of this proposed species that would overlap with the current sites of the ongoing reintroductions of D. couperi.

This 'two species hypothesis' began to make waves in the herpetological conservation community as different cohorts of observers began a discourse about whether or not this study provided grounds to argue that the Indigo reintroduction project had been reintroducing the "wrong historical entity" back onto the landscape, as the 2016 paper suggested.

Soon after the publication of the 2016 paper, a response study was initiated by a group of professionals involved in D. couperi research and conservation. The study was sponsored, in part, by the Alabama Department of Conservation and Natural Resources, Auburn University, the Orianne Society, and the U.S. Fish and Wildlife Service. Their subsequent response paper, addressing the "two species hypothesis", was submitted in 2018 and accepted/published in the spring of 2019 during the time this ethnographic research was being conducted with the CFZ's Orianne Center; then Director, Michelle Hoffman was one of the paper's co-authors.

The 2019 paper rejected the "two species hypothesis" and the implication that the Indigo Reintroduction Project had potentially been participating in the conservation reintroductions of the "wrong historical entity" into the Conecuh and Apalachicola sites. Conducting independent population genetic, phylogenetic, mitochondrial and nuclear gene

analyses, the study reestablished D. couperi as a single species. Additionally, the authors of the paper cautioned reviewers of future research to be "particularly critical" of studies that do not account for certain population level genetic phenomena; noting that the 2016 was attempting a species split based on largely morphological criteria. Especially when the species in question are the subject of ongoing conservation efforts and when there are "high costs of erroneous diversity…[for] imperiled species."

Chapter 5 Rio Mora National Wildlife Refuge (RMNWR) is a 4,200 acre conservation refuge in northeastern New Mexico. The refuge was donated to the U.S. Fish and Wildlife Service (USFWS) in 2012 by philanthropist Eugene Thaw. Situated within the 1 million acre Rio Mora River Watershed, RMNWR serves as a habitat restoration site of critically imperiled Short Grass Prairie ecosystems.

Rio Mora Refuge was included in this research for multiple reasons, the first of which is that the Refuge is managed under a unique Memorandum of Understanding (MOU) in which the Denver Zoological Foundation (Denver Zoo) serves the operational manager of the refuge via onsite staff employed by Denver Zoo's Field Conservation Department. The second reason for Rio Mora's inclusion is that the Refuge also stands as a novel example for conservation activities in the United States. In addition to the USFWS' inclusion of a Zoological Institution as a managing partner, Rio Mora Refuge is the only site in the United States where a reintroduced American Bison herd, owned and managed by a native tribe (the Pueblo of Pojoaque), is grazed on federally protected conservation land. The Refuge as an additional research and community partner, New Mexico Highlands University, that serves primarily Latino and indigenous students.

Through interviews with Denver Zoo Field Conservation staff, both those employed in Colorado and those who live and work in New Mexico, this chapter interweaves the history of the refuge and its founding (especially from its Founding Scientist), with the partnership dynamics/challenges, and conservation philosophies and practices that guide its current activities. Ultimately, through these explorations this chapter describes how the zoo-adjacent conservation professionals who founded and currently participate in running Rio Mora Refuge, understand the challenges facing contemporary landscape scale habitat conservation. They explicitly describe how 'fortress conservation' and 'protected areas'—including RMNWR's 4.200 acres, along with governmental bodies and non-governmental organizations simply do not have the capacity to adequately conserve (or restore) landscape scale ecosystems. Thusly, it is from this explicit recognition that these professionals shape an intentional conservation practice that is externally focused on the landscapes of the Rio Mora River Watershed. In this way, the habitat restoration activities, indigenous partnerships, research, and public integration all serve to shape Rio Mora as novel model for conservation praxis that can participate in addressing the challenges of conservation at a landscape scale. Ultimately, Rio Mora National Wildlife Refuge serves as a socio-ecological case-example in which conservation(ists) are working with diverse stakeholders across public, private, and tribal lands in order to establish a model of conservation intervention that eschews the reliance upon 'fortress'-style protected area conservation in order to more adequately address environmental realities; employing an explicitly socio-ecological conservation praxis as a means to integrate into a socio-ecological landscape.

Update: Following the SARS-CoV2 pandemic, the Denver Zoo executive board terminated the majority of its Field Conservation Department positions and began the dissolution of the Department. Following a reorganization in 2020, as of spring 2021 the Rio Mora National Wildlife Refuge program had been removed from Denver Zoo's website.

PROBLEMS AND RECOMMENDATIONS

Following the conclusion of 13 months of field research in 2018 and 2019, and the completion of the larger doctoral dissertation of which this Executive Summary document is a brief summation, there are a number of practical problems and recommendations that that carry this project forward.

Problem #1:

Conservation Professionals and Social Science(ists): While the conducting of this project's field research there were innumerable instances in which it became clear that well-meaning conservation professionals are often in frustrating positions of grappling with issues of social, political, and cultural complexity for which they are generally untrained. In many cases conservation actors communicated how they are left contending with complex social issues that arose as a result of unforeseen/ uninvestigated features of their program design and its socio-political contexts. Professionals also discussed the kinds of information they wish they had about the different affected human populations that intersect with conservation interests. Additionally, others identified failures of their projects that were directly linked to socio-cultural breakdowns, both from within project partners as well as underexamined outside actors.

These are just a few of the examples that were encountered during this project's field research in which the need for the consistent inclusion of social science(ists) within conservation activities was explicitly clear. Importantly, there is a vital distinction between 'social science' and 'social scient*ists*'. A few times during this fieldwork conservationists expressed a desire to acquire 'social science training' so they could include these elements in their research design. It is imperative to recognize that social science research methods and their underpinning rigor of concepts, theories, and ethics cannot be divorced. Engagement in ethical human subjects research, especially when there is a present power differential between actors (as with much conservation), demands that researchers have extensive training and practical experience, including in the ethics and power dynamics inherent in any social research. While there should indeed be increased social and cultural education in conservation training programs, conservation professionals extracting social science methods for their isolated applications is not the answer.

Recommendation:

Even amidst recognition of the social and cultural complexities that are inextricable from conservation activities, it was also continually clear that a majority of conservation professionals are generally unfamiliar with the breadth of environmental social scientists (e.g. anthropologists, human geographers, sociologists) and longstanding environmental social science research and knowledge. A primary recommendation is a call for the normalization of interdisciplinary teams/staffs, with the inclusion of environmental social scientists—either as contracted experts or as full-time staff. An intentional outcome of this change in conservation practice would be the inclusion of social scientific knowledge and research from the very initial development stages of conservation program conceptualization and design. The presence of experts with rigorous training and experience surrounding issues of human *and* environmental equity and grounded research methods will participate in moving the field of 'conservation' towards equitable applications of socio-ecological frameworks of human-environmental relations.

Problem #2:

Social Scientists' Relationships to Conservation: As the introductory chapter of this dissertation states, there is a long history of social scientific analyses of conservation activities. However, as is noted, the vast majority of that social scientific attention and criticism have overrepresented transnational 'parks and people' conservation activities. While the extensive critiques of this body of practice over the last 5 decades has been vital and important, as a result of its over-representation in social scientific literature there exists a lack of engagement with the wider array of environmental conservation activities, and especially activities that are undertaken in industrialized nations and the global north.

Recommendation:

There is an ongoing need to identify, examine, and combat highly problematic nature conservation activities. However, in the face of ongoing and accelerating climate change, biodiversity declines, land-cover change, and species extinctions there must also be a concerted effort on the part of social scientists to identify environmental actors and activities with whom they share overlapping concerns and mutually effective ethical commitments. Climate change and ecological reconfigurations are ongoing undeniable examples of socio-ecological interrelations. There is no healthy human future without ecological equity, and ecological justice efforts must always be interwoven with human justice. It is long past time that critical environmental social scientists let go of their long-standing myopia in regards to nature conservation efforts and recognize the vital global need for change that centers recognition of human-environment interconnections, inter-reliance, and resilience. This additionally means embracing the already underway

transition within anthropology and other social sciences towards problem-focused engagement and the application of social science knowledge and skills to address real-world issues.

Problem #3:

Zoological Institutions and embracing a conservation transition: The primary issue in this arena, despite messaging from their accrediting associations, is that zoological institutions are still committing 97%+ of annual budgets to activities *other* than conservation. As this document discusses, in the context of ongoing environmental change, zoological institutions (including: zoos, aquariums, botanic gardens) are well positioned to drastically increase their commitments to conservation activities. Yet, these efforts have been halting and inconsistently applied.

Recommendation:

In the context of environmental change, it is time for zoological institutions to embrace a real and material transition in their organizational models. These institutions must commit their efforts in such a way that the majority of future activities are directly associated with field conservation programming and the captive management of species in need of support. Under this transition, what public display activities remain (recognizing the financial model) should be explicitly tied to critical needs of global biodiversity. Zoological institutions represent important professional capacities in captive animal management, and these skills should be committed in their totality to material support for imperiled species and habitats.

Importantly, this recommendation is not equivalent to the current AZA/WAZA models in which they seek to add percentage points to budget allocations towards conservation activities. But rather, this recommendation is for a complete organizational model transformation. Further still, as Chapter 5 of this document discusses, these institutions are also well situated to embrace truly socio-ecologically integrative conservation efforts through their long-standing practices of diverse partnerships and engagement with communities and local populations. An organizational capacity feature that is often lacking in more traditional conservation organizations and activities.

As the challenges of the 2020-2021 pandemic highlighted, the current model for conservation commitments by zoos and aquariums is reliant upon ‘best case scenario’ circumstances. When conservation actions are not the central model or core priority, they are more easily set aside by organizational decision makers who continue to favor the conventional zoo model focused on campuses and animal displays. An embracing of a true ‘conservation transition’ would mean that even during challenging times, conservation activities would remain central to organizational priorities, and would no longer be subject to fair-weather circumstances.

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